Reasoned document of Final draft of IRS Specification for Metal Liners For Use With Elastic Rail Clips Sl. No T-56– ~~2020~~ 2024(First Revision):

SN	Exiting clause of IRS Specification Sl. No T-56 – 2020	Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)	Comments Received from Firms	RDSO's Remarks	Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)
1.0	0**FOREWORD:** 0.1 This specification is framed for facilitating inspection and procurement of metal liners for use with Elastic Rail Clip on concrete sleepers. This specification was initially adopted as 'Provisional Specification 1995'.To make the specification self-explanatory and to improve quality of the product the specification is revised as first revision and issued in 2010 with the view to include sources of raw material, hardness test and marking of Lot No. of the product. Applicability of Freedom from Surface Defect test has been specified for Pre-acceptance & Acceptance test.	0 **FOREWORD:** 0.1 This specification is framed for facilitating inspection and procurement of metal liners for use with Elastic Rail Clip on concrete sleepers. This specification was initially adopted as 'Provisional Specification 1995'.To make the specification self-explanatory and to improve quality of the product the specification is revised as first revision and issued in 2010 with the view to include sources of raw material, hardness test and marking of Lot No. of the product. Applicability of Freedom from Surface Defect test has been specified for Pre-acceptance & Acceptance test.	**Nil**	**Nil**	0 **FOREWORD:** 0.1 This specification is framed for facilitating inspection and procurement of metal liners for use with Elastic Rail Clip on concrete sleepers. This specification was initially adopted as 'Provisional Specification 1995'.To make the specification self-explanatory and to improve quality of the product the specification is revised as first revision and issued in 2010 with the view to include sources of raw material, hardness test and marking of Lot No. of the product. Applicability of Freedom from Surface Defect test has been specified for Pre-acceptance & Acceptance test.
2.0	0.2 Due to discontinuation in publishing the list of sources of structural steel item in Vendor Directory by RDSO and non-identification of integrated steel plants by Joint Plants Committee for procurement, the requirement of steel for rolling of metal liner bars has been revised in the specification so as to improve the quality & serviceability of metal liner bars as well as metal liners henceforth on sustained basis.	0.2 Due to discontinuation in publishing the list of sources of structural steel item in Vendor Directory by RDSO and non-identification of integrated steel plants by Joint Plants Committee for procurement, the requirement of steel for rolling of metal liner bars has been revised in the specification so as to improve the quality & serviceability of metal liner bars as well as metal liners henceforth on sustained basis.	**Nil**	**Nil**	0.2 Due to discontinuation in publishing the list of sources of structural steel item in Vendor Directory by RDSO and non-identification of integrated steel plants by Joint Plants Committee for procurement, the requirement of steel for rolling of metal liner bars has been revised in the specification so as to improve thequality & serviceability of metal liner bars as well as metal liners henceforth on sustained basis.
3.0	0.3 The specification was revised as Provisional-2013 with a view to cover the specification & sources for raw material for use by the manufacturer of metal liners and to exercise checks of the steel being used. The chemical composition & mechanical properties of the steel were revised to conform to grade designation E250 Quality C as laid down in Table 1 & Table 2 of IS: 2062-2011 respectively. The chemical composition and metallurgical properties to be tested on raw material (metal liner bar) and finished product (metal liner) were defined.	0.3 The specification was revised as Provisional-2013 with a view to cover the specification & sources for raw material for use by the manufacturer of metal liners and to exercise checks of the steel being used. The chemical composition & mechanical properties of the steel were revised to conform to grade designation E250 Quality C as laid down in Table 1 & Table 2 of IS: 2062-2011 respectively. The chemical composition and metallurgical properties to be tested on raw material (metal liner bar) and finished product (metal liner) were defined.	**Nil**	**Nil**	0.3 The specification was revised as Provisional-2013 with a view to cover the specification & sources for raw material for use by the manufacturer of metal liners and to exercise checks of the steel being used. The chemical composition & mechanical properties of the steel were revised to conform to grade designation E250 Quality C as laid down in Table 1 & Table 2 of IS: 2062-2011 respectively. The chemical composition and metallurgical properties to be tested on raw material (metal liner bar) and finished product (metal liner) were defined.

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4.0	0.4 This specification has now been revised and issued in 2020 to cover the corrigendum issued to this specification till date and to update the latest revision of IS codes.	0.4 This specification has now been revised and issued in 2020 to cover the corrigendum issued to this specification till date and to update the latest revision of IS codes.	**Nil**	**Nil**	0.4 This specification has now been revised and issued in 2020 to cover the corrigendum issued to this specification till date and to update the latest revision of IS codes.
5.0	----------	0.5This specification has been revised to incorporate Technical requirements for hot dip galvanizing of low carbon steel metal liner to IS: 2062 and the corrigendum No.-1 issued in the year 2022 to this specification and to update the latest revision of IS codes	Para has been added	Para has been added	0.5This specification has been revised to incorporate Technical requirements for hot dip galvanizing of low carbon steel metal liner to IS: 2062 and the corrigendum No.-1 issued in the year 2022 to this specification and to update the latest revision of IS codes
6.0	**1.0 SCOPE:** This standard covers the general requirements, inspection and testing procedure for metal liners, here after referred to as "LINERS". The metal liner bars used for manufacture of liners shall be referred to as 'RAW MATERIAL'. All the provisions contained RDSO's ISO Procedures laid down in Document No. QO-D-8.1-11 dated 22.06.2020 (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.	1.0 **SCOPE:** This standard covers the general requirements, inspection and testing procedure for metal liners, here after referred to as "LINERS". The metal liner bars used for manufacture of liners shall be referred to as 'RAW MATERIAL'. All the provisions contained RDSO's ISO Procedures laid down in Document No. QO-D-8.1-11 dated 22.06.2020 (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.	**Nil**	**Nil**	1.0 **SCOPE:** This standard covers the general requirements, inspection and testing procedure for metal liners, here after referred to as "LINERS". The metal liner bars used for manufacture of liners shall be referred to as 'RAW MATERIAL'. All the provisions contained RDSO's ISO Procedures laid down in Document No. QO-D-8.1-11 dated 22.06.2020 (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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7.0	**REFERENCE DOCUMENTS:** i) IS 228 - (Part 1) 1987 (Reaffirmed 2018)- Determination of carbon by Volumetric method (for carbon 0.05 to 2.50 percent) Third revision ii) IS-228-(Part 3) - 1987 (Reaffirmed 2018) - Determination of phosphorus by alkali metric method iii) IS-228-(Part 8)-1989 (Reaffirmed 2019) - Determination of silicon by gravimetric method (for silicon 0.05 to 5.00%). iv) IS-228-(Part 12)-2001 (Reaffirmed 2019) - Determination of manganese by periodatespectro photometric method in plain carbon, low alloy and high alloy steels (For manganese 0.01 to 5.0%). v) IS-228-(Part 20)-2003 (Reaffirmed 2019)- Determination of carbon and sulphur by infrared absorption method (for carbon 0.005 to 2% and sulphur 0.001 to 0.35%) vi) S-1153-2000 (Reaffirmed 2016) - Specification for temporary corrosion preventives, hard film, solvent deposited) vii) IS-1500-2005 (Reaffirmed 2010)-Method for Brinell hardness test for metallic materials. (Superseded by IS 1500: Part 1 to Part 4) viii) IS-1599-1985 (Reaffirmed 2019) - Metallic Materials-Bend Test (Fourth revision)	**REFERENCE DOCUMENTS:** i) IS 209 : 1992 (Reaffirmed Year : 2018) Zinc Ingot. ii) IS 228-(Part 1) 1987 (Reaffirmed 2018) - Determination of carbon by Volumetric method (for carbon 0.05 to 2.50 percent) Third revision iii) IS-228-(Part 3)-1987 (Reaffirmed 2018)- Determination of phosphorus by alkali metric method iv) IS-228-(Part 8)-1989 (Reaffirmed 2019) - Determination of silicon by gravimetric method (for silicon 0.05 to 5.00%). v) IS-228-(Part 12)-2001 (Reaffirmed 2019) - Determination of manganese by periodatespectro photometric method in plain carbon, low alloy and high alloy steels (For manganese 0.01 to 5.0%). vi) IS-228-(Part 20)-2003 (Reaffirmed 2019)- Determination of carbon and sulphur by infrared absorption method (for carbon 0.005 to 2% and sulphur 0.001 to 0.35% vii) IS 265 : 2021 Hydrochloric Acid. viii) IS-1153-2000 (Reaffirmed 2016) - Specification for temporary corrosion preventives, hard film, solvent deposited) ix) IS-1500-2005 (Reaffirmed 2010)-Method for Brinell hardness test for metallic materials. (Superseded by IS 1500: Part 1 to Part 4) x) IS-1599-1985 (Reaffirmed 2019) Metallic Materials-Bend Test (Fourth revision) xi) IS-1608-2005-Metalic materials –Tensile testing at ambient temperature. (Superseded by IS 1608:(Part 1:2018) & (Part 3:2018) xii) IS: 1757- (Part-1):2020 (Fourth Revision) - Metallic	**Nil**	Reference has been added	**REFERENCE DOCUMENTS:** i) IS 209 : 1992 (Reaffirmed Year : 2018) Zinc Ingot. ii) IS 228-(Part 1) 1987 (Reaffirmed 2018) - Determination of carbon by Volumetric method (for carbon 0.05 to 2.50 percent) Third revision iii) IS-228-(Part 3)-1987 (Reaffirmed 2018)- Determination of phosphorus by alkali metric method iv) IS-228-(Part 8)-1989 (Reaffirmed 2019) - Determination of silicon by gravimetric method (for silicon 0.05 to 5.00%). v) IS-228-(Part 12)-2001 (Reaffirmed 2019) - Determination of manganese by periodatespectro photometric method in plain carbon, low alloy and high alloy steels (For manganese 0.01 to 5.0%). vi) IS-228-(Part 20)-2003 (Reaffirmed 2019)- Determination of carbon and sulphur by infrared absorption method (for carbon 0.005 to 2% and sulphur 0.001 to 0.35% vii) IS 265 : 2021 Hydrochloric Acid. viii) IS-1153-2000 (Reaffirmed 2016) - Specification for temporary corrosion preventives, hard film, solvent deposited) ix) IS-1500-2005 (Reaffirmed 2010)-Method for Brinell hardness test for metallic materials. (Superseded by IS 1500: Part 1 to Part 4) x) IS-1599-1985 (Reaffirmed 2019) Metallic Materials-Bend Test (Fourth revision) xi) IS-1608-2005-Metalic materials –Tensile testing at ambient temperature. (Superseded by IS 1608:(Part 1:2018) & (Part 3:2018) xii) IS: 1757- (Part-1):2020 (Fourth Revision) - Metallic

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	ix) IS-1608-2005-Metalic materials –Tensile testing at ambient temperature. (Superseded by IS 1608:(Part 1:2018) & (Part 3:2018) x) IS- 2062-2011 (Reaffirmed 2016)- Hot rolled, medium and high tensile structural steel. xi) IS-2500 (Part 1)-2000 (Reaffirmed 2016) Sampling Inspection Procedures- Part 1: Attribute Sampling Plans Indexed by Acceptable Quality limit (AQL) for Lot -by -Lot Inspection xii) IS: 4163-2004 (Reaffirmed 2017) - Determination of Content of Nonmetallic Inclusions- Micrographic Method Using Standard Diagram xiii) IS 4748: 2009 (Reaffirmed 2017) : Steels-Micrographic determination of the apparent grain size s.	Materials-Charpy Pendulum Impact Test. xiii) IS- 2062-2011 (Reaffirmed 2016)- Hot rolled, medium and high tensile structural steel. Xiv) IS-2500 (Part 1)-2000 (Reaffirmed 2016) Sampling Inspection Procedures- Part 1: Attribute Sampling Plans Indexed by Acceptable Quality limit (AQL) for Lot -by -Lot Inspection. xv) BIS IS 2629: 1985 (Reaffirmed Year : 2021): Recommended Practice For Hot-Dip Galvanizing Of Iron And Steel. xvi) IS 2633 : 1986 (Reaffirmed Year : 2021) Methods For TestingUniformity of Coating On Zinc Coated Articles xvii) IS 3203 : 1982 (Reaffirmed Year : 2021) Methods For Testing Local Thickness of Electroplated Coatings xviii) IS: 4163-2004 (Reaffirmed 2017) Determination of Content of Nonmetallic Inclusions- Micrographic Method Using Standard Diagrams. xix) IS 4748: 2009 (Reaffirmed 2017) : Steels-Micrographic determination of the apparent grain size xx) IS 4759: 1996 (Reaffirmed Year: 2021) : HOT-Dip Zinc Coatings On Structural Steel And Other Allied Products. xxi) IS 4905 :2015 (Reaffirmed Year : 2020) Random Sampling and Randomization Procedures xxii) IS 6012 : 1992 (Reaffirmed Year : 2021) Measurement Of Coating Thickness By Eddy Current Method xxiii) IS 61S8 :1984 (Reaffirmed Year : 2021) Recommended Practice For Safeguarding Against Embrittlement Of Hot-Dip Galvanized Iron And Steel			Materials-Charpy Pendulum Impact Test. xiii) IS- 2062-2011 (Reaffirmed 2016)- Hot rolled, medium and high tensile structural steel. Xiv) IS-2500 (Part 1)-2000 (Reaffirmed 2016) Sampling Inspection Procedures- Part 1: Attribute Sampling Plans Indexed by Acceptable Quality limit (AQL) for Lot -by -Lot Inspection. xv) BIS IS 2629: 1985 (Reaffirmed Year : 2021): Recommended Practice For Hot-Dip Galvanizing Of Iron And Steel. xvi) IS 2633 : 1986 (Reaffirmed Year : 2021) Methods For TestingUniformity of Coating On Zinc Coated Articles xvii) IS 3203 : 1982 (Reaffirmed Year : 2021) Methods For Testing Local Thickness of Electroplated Coatings xviii) IS: 4163-2004 (Reaffirmed 2017) Determination of Content of Nonmetallic Inclusions- Micrographic Method Using Standard Diagrams. xix) IS 4748: 2009 (Reaffirmed 2017) : Steels-Micrographic determination of the apparent grain size xx) IS 4759: 1996 (Reaffirmed Year: 2021) : HOT-Dip Zinc Coatings On Structural Steel And Other Allied Products. xxi) IS 4905 :2015 (Reaffirmed Year : 2020) Random Sampling and Randomization Procedures xxii) IS 6012 : 1992 (Reaffirmed Year : 2021) Measurement Of Coating Thickness By Eddy Current Method xxiii) IS 61S8 :1984 (Reaffirmed Year : 2021) Recommended Practice For Safeguarding Against

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		Products xxiv) IS : 6745 : 1972 (Reaffirmed Year : 2021) Methods For Determination Of Mass Of Zinc Coating On Zinc Coated Iron And Steel Articles xxv) IS 6746:1994 (Reaffirmed Year : 2020) : Unsaturated Polyester Resin Systems – Specification xxvi)IS 13229 : 1991 (Reaffirmed Year : 2019) Zinc For Galvanizing			Embrittlement Of Hot-Dip Galvanized Iron And Steel Products xxiv) IS : 6745 : 1972 (Reaffirmed Year : 2021) Methods For Determination Of Mass Of Zinc Coating On Zinc Coated Iron And Steel Articles xxv) IS 6746:1994 (Reaffirmed Year : 2020) : Unsaturated Polyester Resin Systems – Specification xxvi)IS 13229 : 1991 (Reaffirmed Year : 2019) Zinc For Galvanizing
8.0	3.0 **Process of Manufacturing Metal liners**	3.0 **Process of Manufacturing Metal liners**	**Nil**	**Nil**	3.0 **Process of Manufacturing Metal liners**
	i) The metal liner manufacturer shall procure metal liner bars from re-rollers engaged by them.	i) The metal liner manufacturer shall procure metal liner bars from re-rollers engaged by them.	**Nil**	**Nil**	i) The metal liner manufacturer shall procure metal liner bars from re-rollers engaged by them.
	ii) The desired properties and the chemical composition of the metal liner bars shall conform to be within the stipulations of IS: 2062:2011 (Grade designation E250, Quality C).	ii) The desired properties and the chemical composition of the metal liner bars shall conform to be within the stipulations of IS: 2062:2011 (Grade designation E250, Quality C).	**Nil**	**Nil**	ii) The desired properties and the chemical composition of the metal liner bars shall conform to be within the stipulations of IS: 2062:2011 (Grade designation E250, Quality C).
	iii) Such metal liner bars shall be used for manufacture of metal liners by the process of shearing, punching, grinding etc. which shall conform to the desired chemical & mechanical properties as contained in this specification.	iii) Such metal liner bars shall be used for manufacture of metal liners by the process of shearing, punching, grinding etc. which shall conform to the desired chemical & mechanical properties as contained in this specification.	**Nil**	**Nil**	iii) Such metal liner bars shall be used for manufacture of metal liners by the process of shearing, punching, grinding etc. which shall conform to the desired chemical & mechanical properties as contained in this specification.

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9.0	**4.0 Procurement of Raw material (Metal liner Bars)**	**4.0 Procurement of Raw material (Metal liner Bars)**	**Nil**	**Nil**	**4.0 Procurement of Raw material (Metal liner Bars)**
	i) The Metal Liner bars shall be supplied in hot rolled and normalized heat treated condition.	i) The Metal Liner bars shall be supplied in hot rolled and normalized heat treated condition.	**Nil**	**Nil**	i) The Metal Liner bars shall be supplied in hot rolled and normalized heat treated condition.
	ii) The steel used for metal liner should be of killed quality manufactured by any process of steel making except Bessemer process followed by secondary refining. Metal Liner manufacturer shall obtain a certificate for the same from metal liner bar manufacturer (re-roller approved by them)/ Billet manufacturer and shall produce this certificate at the time of offering the material for inspection. a) The chemical composition of the steel should conform to grade designation E250 Quality C as laid down in Table 1 of IS: 2062-2011.	ii) The steel used for metal liner should be of killed quality manufactured by any process of steel making except Bessemer process followed by secondary refining. Metal Liner manufacturer shall obtain a certificate for the same from metal liner bar manufacturer (re-roller approved by them)/ Billet manufacturer and shall produce this certificate at the time of offering the material for inspection. a) The chemical composition of the steel should conform to grade designation E250 Quality C as laid down in Table 1 of IS: 2062-2011.	**Nil**	**Nil**	ii) The steel used for metal liner should be of killed quality manufactured by any process of steel making except Bessemer process followed by secondary refining. Metal Liner manufacturer shall obtain a certificate for the same from metal liner bar manufacturer (re-roller approved by them)/ Billet manufacturer and shall produce this certificate at the time of offering the material for inspection. a) The chemical composition of the steel should conform to grade designation E250 Quality C as laid down in Table 1 of IS: 2062-2011.

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b) When the steel is killed by silicon alone, the silicon content shall not be less than 0.1%. When steel is killed by Aluminium alone, the Aluminium content shall not be less than 0.02%. When the steel is killed by Silicon–Aluminium, the Silicon content shall not be less than 0.03% and total Aluminium content shall not be less than 0.01%. Metal liner manufacturer shall obtain a certificate for the same metal liner bar manufacturer (re-roller approved by them)/ Billet manufacturer and shall produce this certificate at the time of offering the material for inspection</td><td>TABLE 1: CHEMICAL COMPOSITION
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	iii) The liner bars after hot rolling shall further be subjected to normalizing heat treatment by properly soaking in appropriate austenitic state for a suitable period followed by cooling in still air.	iii)The liner bars after hot rolling shall further be subjected to normalizing heat treatment by properly soaking in appropriate austenitic state for a suitable period followed by cooling in still air.	**Nil**	**Nil**	iii)The liner bars after hot rolling shall further be subjected to normalizing heat treatment by properly soaking in appropriate austenitic state for a suitable period followed by cooling in still air.
	iv) The mechanical properties Tensile strength, Yield strength, % elongation, bend test &Charpy Impact Test of the liner bars shall conform to grade designation E250 Quality C as laid down in Table 2 of IS:2062- 2011.	iv)The mechanical properties Tensile strength, Yield strength, % elongation, bend test &Charpy Impact Test of the liner bars shall conform to grade designation E250 Quality C as laid down in Table 2 of IS:2062- 2011.	**Nil**	**Nil**	iv) The mechanical properties Tensile strength, Yield strength, % elongation, bend test &Charpy Impact Test of the liner bars shall conform to grade designation E250 Quality C as laid down in Table 2 of IS:2062- 2011.

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<tr><td></td><td>v) The inclusion content of the liner bars shall be in accordance with IS: 4163-2004 in longitudinal section, inclusion rating shall not be worse than 2.0 A,B,C,D for both thick and thin series when compared to the chart for determining the inclusion content of secondary refined steels (Fig. 2) of IS: 4163-2004.</td><td>v) The inclusion content of the liner bars shall be in accordance with IS: 4163-2004 in longitudinal section, inclusion rating shall not be worse than 2.0 A,B,C,D for both thick and thin series when compared to the chart for determining the inclusion content of secondary refined steels (Fig. 2) of IS: 4163-2004.</td><td>Nil</td><td>Nil</td><td>v) The inclusion content of the liner bars shall be in accordance with IS: 4163-2004 in longitudinal section, inclusion rating shall not be worse than 2.0 A,B,C,D for both thick and thin series when compared to the chart for determining the inclusion content of secondary refined steels (Fig. 2) of IS: 4163-2004.</td></tr>
<tr><td></td><td>vi) The microstructure of the steel should be fine grains ferrite and pearlite with grain size of ASTM-6 or finer.</td><td>vi)The microstructure of the steel should be fine grains ferrite and pearlite with grain size of ASTM-6 or finer.</td><td>Nil</td><td>Nil</td><td>vi)The microstructure of the steel should be fine grains ferrite and pearlite with grain size of ASTM-6 or finer.</td></tr>
<tr><td></td><td>vii) The hardness of steel shall be in accordance with IS: 1500-2005 and shall not be less than 115</td><td>vii)The hardness of steel shall be in accordance with IS: 1500-2005 and shall not be less than 115</td><td>Nil</td><td>Nil</td><td>vii)The hardness of steel shall be in accordance with IS: 1500-2005 and shall not be less than 115</td></tr>
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	BHN.	BHN.			BHN.
	viii) The chemical and mechanical properties to be tested on metal liner bar shall be Chemical composition, Hardness, Inclusion content, Microstructure & Grain size, Tensile strength, Yield strength, % elongation & Bend test in accordance to IS: 2062:2011. Metal liner manufacture shall carryout all these tests at the rate of two samples per 20 metric tonnes of metal liner bar or per heat whichever is less. Metal liner manufacture shall also preserve and submit the test pieces of the raw material of metal liner bar to the inspecting official for verification of chemical and mechanical properties.	viii) The chemical and mechanical properties to be tested on metal liner bar shall be Chemical composition, Hardness, Inclusion content, Microstructure & Grain size, Tensile strength, Yield strength, % elongation & Bend test in accordance to IS: 2062:2011. Metal liner manufacture shall carryout all these tests at the rate of two samples per 20 metric tonnes of metal liner bar or per heat whichever is less. Metal liner manufacture shall also preserve and submit the test pieces of the raw material of metal liner bar to the inspecting official for verification of chemical and mechanical properties.	**Nil**	**Nil**	viii) The chemical and mechanical properties to be tested on metal liner bar shall be Chemical composition, Hardness, Inclusion content, Microstructure & Grain size, Tensile strength, Yield strength, % elongation & Bend test in accordance to IS: 2062:2011. Metal liner manufacture shall carryout all these tests at the rate of two samples per 20 metric tonnes of metal liner bar or per heat whichever is less. Metal liner manufacture shall also preserve and submit the test pieces of the raw material of metal liner bar to the inspecting official for verification of chemical and mechanical properties.
	ix) The metal liner manufacturer shall be responsible to ensure that only proper quality of billet is used by re-roller (approved by them) for rolling of metal liner bars.	ix) The metal liner manufacturer shall be responsible to ensure that only proper quality of billet is used by re-roller (approved by them) for rolling of metal liner bars.	**Nil**	**Nil**	ix) The metal liner manufacturer shall be responsible to ensure that only proper quality of billet is used by re-roller (approved by them) for rolling of metal liner bars.
10.0	**5.0 Pre-Acceptance Tests: Deleted**	**5.0 Pre-Acceptance Tests: Deleted**	Nil	Nil	**5.0 Pre-Acceptance Tests: Deleted**
	5.1~~For initial registration /approval, the manufacturer shall manufacture metal liners in presence of Inspecting Authority. 16 samples shall be drawn randomly from the lot so produced for initial testing. In addition, the manufacturer shall also furnish 5 Nos. test specimens each for tensile and bend test for testing.~~	5.1~~For initial registration /approval, the manufacturer shall manufacture metal liners in presence of Inspecting Authority. 16 samples shall be drawn randomly from the lot so produced for initial testing. In addition, the manufacturer shall also furnish 5 Nos. test specimens each for tensile and bend test for testing.~~	Nil	Nil	-----
	~~5.2 Samples manufactured in presence of representative of Inspecting Authority shall be~~	~~5.2 Samples manufactured in presence of representative of Inspecting Authority shall be~~	Nil	Nil	-------

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	~~tested as per scheme of testing 'A' given in Annexure-I.~~	~~tested as per scheme of testing 'A' given in Annexure-I.~~			
11.0	**6.0 Acceptance Tests** Tests as per Para 6.2 to 6.8 shall be conducted on liners for acceptance of the material as per scheme of testing 'B' given in Annexure I.	**6.0 Acceptance Tests** Tests as per Para ~~6.2~~ to ~~6.8~~6.9 shall be conducted on liners for acceptance of the material as per scheme of testing '~~B'~~A given in Annexure I.	Nil	Nil	**6.0 Acceptance Tests** Tests as per Para ~~6.2~~ to ~~6.8~~6.9 shall be conducted on liners for acceptance of the material as per scheme of testing '~~B'~~A given in Annexure I.
12.0 13.0	**6.1 LOT/BATCH FOR TESTING:** For the purpose of inspection, maximum 30,000 liners shall form a lot. Lot no. shall be punch marked on the liner as per drawing. For identity of material, the firm shall certify heat number of the above lot. The metal liner manufacturer shall produce heat-wise complete certificate of chemical analysis of metal liner bar obtained from metal liner bar manufacturer at the time of inspection of the liners. **6.2 CHEMICAL ANALYSIS:** Three sample liners per lot shall be tested as per stipulations of sub clause 8.1 and 8.2 of IS-2062:2011. Testing shall be done on middle portion of the liner and the chemical composition shall conform to the following:	**6.1LOT/BATCH FOR TESTING:** For the purpose of inspection, maximum 30,000 liners shall form a lot. Lot no. shall be punch marked on the liner as per drawing. For identity of material, the firm shall certify heat number of the above lot. The metal liner manufacturer shall produce heat-wise complete certificate of chemical analysis of metal liner bar obtained from metal liner bar manufacturer at the time of inspection of the liners. **6.2CHEMICAL ANALYSIS:** Three sample liners per lot shall be tested as per stipulations of sub clause 8.1 and 8.2 of IS-2062:2011. Testing shall be done on middle portion of the liner and the chemical composition shall conform to the following:	Nil	Nil	**6.1LOT/BATCH FOR TESTING:** For the purpose of inspection, maximum 30,000 liners shall form a lot. Lot no. shall be punch marked on the liner as per drawing. For identity of material, the firm shall certify heat number of the above lot. The metal liner manufacturer shall produce heat-wise complete certificate of chemical analysis of metal liner bar obtained from metal liner bar manufacturer at the time of inspection of the liners. **6.2 CHEMICAL ANALYSIS:** Three sample liners per lot shall be tested as per stipulations of sub clause 8.1 and 8.2 of IS-2062:2011. Testing shall be done on middle portion of the liner and the chemical composition shall conform to the following:

<table>
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<tr>
<td></td>
<td>
<table>
<tr><th>Element</th><th>Ladle analysis % (Max.)</th><th>In product analysis max. variation over the limit specified for ladle analysis</th></tr>
<tr><td>C</td><td>0.20</td><td>0.02</td></tr>
<tr><td>Mn</td><td>1.50</td><td>0.05</td></tr>
<tr><td>Si</td><td>0.40</td><td>0.03</td></tr>
<tr><td>S</td><td>0.040</td><td>0.005</td></tr>
<tr><td>P</td><td>0.040</td><td>0.005</td></tr>
</table>
If the chemical composition does not conform to the specified limit, the lot shall be rejected.

The chemical analysis shall be done either spectrographically or through wet analysis as required by inspecting agency.
</td>
<td>
<table>
<tr><th>Element</th><th>Ladle analysis % (Max.)</th><th>In product analysis max. variation over the limit specified for ladle analysis</th></tr>
<tr><td>C</td><td>0.20</td><td>0.02</td></tr>
<tr><td>Mn</td><td>1.50</td><td>0.05</td></tr>
<tr><td>Si</td><td>0.40</td><td>0.03</td></tr>
<tr><td>S</td><td>0.040</td><td>0.005</td></tr>
<tr><td>P</td><td>0.040</td><td>0.005</td></tr>
</table>
If the chemical composition does not conform to the specified limit, the lot shall be rejected.

The chemical analysis shall be done either spectrographically or through wet analysis as required by inspecting agency.
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<tr><th>Element</th><th>Ladle analysis % (Max.)</th><th>In product analysis max. variation over the limit specified for ladle analysis</th></tr>
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If the chemical composition does not conform to the specified limit, the lot shall be rejected.

The chemical analysis shall be done either spectrographically or through wet analysis as required by inspecting agency.
</td>
</tr>
<tr>
<td>14.</td>
<td>6.3 Dimensional Check

6.3.1 Sample size:
Sampling plan as per IS–2500 (Part-1):2000 to be followed. For dimensional check, the sample size and the acceptance & rejection number for inspection level II and AQL 2.5% shall be as per IS–2500 (Part-1):2000 and is summarized at Annexure VII of this standard.</td>
<td>6.3 Dimensional Check

6.3.1 Sample size:

Sampling plan as per IS–2500 (Part-1):2000 to be followed. For dimensional check, the sample size and the acceptance & rejection number for inspection level II and AQL 2.5% shall be as per IS–2500 (Part-1):2000 and is summarized at Annexure VII of this standard.</td>
<td>Nil</td>
<td>Nil</td>
<td>6.3 Dimensional Check

6.3.1 Sample size:

Sampling plan as per IS–2500 (Part-1):2000 to be followed. For dimensional check, the sample size and the acceptance & rejection number for inspection level II and AQL 2.5% shall be as per IS–2500 (Part-1):2000 and is summarized at Annexure VII of this standard.</td>
</tr>
</table>

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14.	**6.3.2 TEST:** The sample liners shall be checked for dimensions and shall meet the requirement of dimensions and tolerances as provided in the drawing of the respective liner. Checking of the dimensions shall be made by means of approved inspection gauges to be provided by the supplier.	**6.3.2 TEST:** The sample liners shall be checked for dimensions and shall meet the requirement of dimensions and tolerances as provided in the drawing of the respective liner. Checking of the dimensions shall be made by means of approved inspection gauges to be provided by the supplier.	Nil	Nil	**6.3.2 TEST:** The sample liners shall be checked for dimensions and shall meet the requirement of dimensions and tolerances as provided in the drawing of the respective liner. Checking of the dimensions shall be made by means of approved inspection gauges to be provided by the supplier.
15.	**6.3.3 INSPECTION GAUGES:** Minimum two sets of inspection gauges shall be manufactured by the supplier as per RDSO approved drawing / manufacturer's drawing as the case be and shall be got approved by Purchaser/Inspecting authority before use. Out of these, one set of inspection gauges shall be used as master gauge and preserved safely by the liner manufacturer. The second set shall be used by the inspecting officer during inspection. For internal quality checks the firm should use additional set of gauges as per drawing.	**6.3.3 INSPECTION GAUGES:** Minimum two sets of inspection gauges shall be manufactured by the supplier as per RDSO approved drawing / manufacturer's drawing as the case be and shall be got approved by Purchaser/Inspecting authority before use. Out of these, one set of inspection gauges shall be used as master gauge and preserved safely by the liner manufacturer. The second set shall be used by the inspecting officer during inspection. For internal quality checks the firm should use additional set of gauges as per drawing.	Nil	Nil	**6.3.3 INSPECTION GAUGES:** Minimum two sets of inspection gauges shall be manufactured by the supplier as per RDSO approved drawing / manufacturer's drawing as the case be and shall be got approved by Purchaser/Inspecting authority before use. Out of these, one set of inspection gauges shall be used as master gauge and preserved safely by the liner manufacturer. The second set shall be used by the inspecting officer during inspection. For internal quality checks the firm should use additional set of gauges as per drawing.
16.	**6.4 TENSILE TEST, BEND TEST AND: CHARPY IMPACT TEST** As it is not possible to draw tensile, bend test and Charpy Impact Test pieces from finished liners, the same shall be conducted on specially prepared samples. Three test samples for these tests shall be prepared by the metal liner manufacturer from same heat of metal liner bars	**6.4 TENSILE TEST, BEND TEST AND: CHARPY IMPACT TEST** As it is not possible to draw tensile, bend test and Charpy Impact Test pieces from finished liners, the same shall be conducted on specially prepared samples. Three test samples for these tests shall be prepared by the metal liner manufacturer from same heat of metal liner bars used for	Nil	Nil	**6.4 TENSILE TEST, BEND TEST AND: CHARPY IMPACT TEST** As it is not possible to draw tensile, bend test and Charpy Impact Test pieces from finished liners, the same shall be conducted on specially prepared samples. Three test samples for these tests shall be prepared by the metal liner manufacturer from same heat of metal liner bars

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<tr>
<td></td>
<td>used for manufacture of liners. The test samples shall be prepared from rectangular section of raw material for each lot and shall be preserved heat wise. The test samples shall be produced by the firm for testing at the time of inspection of liner of respective heat. The chemical composition & mechanical properties namely Tensile strength, yield strength, % elongation & bend test of the liner bars shall conform to grade designation E250 Quality C as laid down in Table 2 of IS:2062- 2011.

The test pieces should be prepared as per sketch shown at Annexure-IX. Salient dimensions of test piece are as under:

<table>
<tr><th>S. No</th><th>Description of test piece</th><th>Tensile test piece</th><th>Bend test piece</th><th>Charpy Impact Test</th></tr>
<tr><td>(i)</td><td>Width</td><td>12.5 mm</td><td>20 mm</td><td>10 mm</td></tr>
</table>
</td>
<td>manufacture of liners. The test samples shall be prepared from rectangular section of raw material for each lot and shall be preserved heat wise. The test samples shall be produced by the firm for testing at the time of inspection of liner of respective heat. The chemical composition & mechanical properties namely Tensile strength, yield strength, % elongation & bend test of the liner bars shall conform to grade designation E250 Quality C as laid down in Table 2 of IS:2062- 2011

The test pieces should be prepared as per sketch shown at Annexure-IX. Salient dimensions of test piece are as under:

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<tr><th>S. No.</th><th>Description</th><th>Tensile test piece</th><th>Bend test piece</th><th>Charpy Impact Test</th></tr>
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<td>used for manufacture of liners. The test samples shall be prepared from rectangular section of raw material for each lot and shall be preserved heat wise. The test samples shall be produced by the firm for testing at the time of inspection of liner of respective heat. The chemical composition & mechanical properties namely Tensile strength, yield strength, % elongation & bend test of the liner bars shall conform to grade designation E250 Quality C as laid down in Table 2 of IS:2062-2011.

The test pieces should be prepared as per sketch shown at Annexure-IX. Salient dimensions of test piece are as under:

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	(ii)	Thickness	(i) 5mm for liner to drawing No RT-3740. (ii) as available for all other liners	(i) 5mm for liner to drawing No RT-3740. (ii) as available for all other liners	10 mm	(ii)	Thickness	(i) 5mm for liner to drawing No RT-3740. (ii) as available for all other liners	(i) 5mm for liner to drawing No RT-3740. (ii) as available for all other liners	10 mm			(ii)	Thickness	(i) 5mm for liner to drawing No RT-3740.(ii) as available for all other liners	(i) 5mm for liner to drawing No RT-3740. (ii) as available for all other liners	10 mm
	(iii	Total length	200-300 mm	Depending on thickness and testing equipment	55 mm (In the centre of the length there shall be a V-notchof 45^0 included angle, 2 mm deep, with 0.25 mm root radius.)	(iii)	Total length	200-300 mm	Depending on thickness and testing equipment	55 mm (In the centre of the length there shall be a V-notch of 45^0 included angle, 2 mm deep, with 0.25 mm root radius.)			(iii)	Total length	200-300 mm	Depending on thickness and testing equipment	55 mm (In the centre of the length there shall be a V-notch of 45^0 included angle, 2 mm deep, with 0.25 mm root

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<tr>
<td></td>
<td>Three samples per lot shall be tested for tensile strength, yield strength, % elongation and , bend test and Charpy test as per clause 10,11 and 12of IS: 2062-2011 and the test results shall conform to the following:
<table>
<tr><th>Tensile strength</th><th>Yield strength</th><th>Elongation % (min.)</th><th>Bend test (Internal</th><th>Charpy Impact Test</th></tr>
<tr><td>410</td><td>250</td><td>23</td><td>2t at 180˚ (U-shape)
On bending there should be no appearance of crack on outer surface of the saple</td><td>27 J (Min)</td></tr>
</table>
</td>
<td>Three samples per lot shall be tested for tensile strength, yield strength, % elongation and , bend test and Charpy test as per clause 10,11 and 12of IS: 2062-2011 and the test results shall conform to the following:
<table>
<tr><th>Tensile strength (min.) MPa</th><th>Yield strength (min.) MPa</th><th>Elongation % (min.)</th><th>Bend test (Internal dia.)</th><th>Charpy Impact Test</th></tr>
<tr><td>410</td><td>250</td><td>23</td><td>2t at 180˚ (U-shape)
On bending there should be no appearance of crack on outer surface of the sample viewed through naked eye</td><td>27 J (Min)</td></tr>
</table>
</td>
<td></td>
<td></td>
<td>
<table>
<tr><td></td><td></td><td></td><td></td><td>radius.)</td></tr>
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Three samples per lot shall be tested for tensile strength, yield strength, % elongation and, bend test and Charpy test as per clause 10, 11 and 12of IS: 2062-2011 and the test results shall conform to the following:
<table>
<tr><th>Tensile strength (min.) MPa</th><th>Yield strength (min.) MPa</th><th>Elongation % (min.) (G.L. =5.65 √So)</th><th>Bend test (Internal dia.)</th><th>Charpy Impact Test</th></tr>
<tr><td>410</td><td>250</td><td>23</td><td>2t at 180˚ (U-shape)
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	<table><tr><td></td><td></td><td></td><td>viewed through naked eye</td><td></td></tr></table> GL =Gauge length, So= Area of cross section, t = Thickness of specimen. Three samples per lot shall be tested for bend test as per clause 6.2 (b) of IS 1599-1985. Three samples per lot shall be tested for Charpy Impact test as per IS 1757-2020	<table><tr><td></td><td></td><td></td><td></td><td></td></tr></table> GL =Gauge length, So= Area of cross section, t = Thickness of specimen. Three samples per lot shall be tested for bend test as per clause 6.2 (b) of IS 1599-1985. Three samples per lot shall be tested for Charpy Impact test as per IS 1757-2020			<table><tr><td></td><td></td><td></td><td>viewed through naked eye</td><td></td></tr></table> GL =Gauge length, So= Area of cross section, t = Thickness of specimen. Three samples per lot shall be tested for bend test as per clause 6.2 (b) of IS 1599-1985. Three samples per lot shall be tested for Charpy Impact test as per IS 1757-2020
17.	**6.5 FREEDOM FROM SURFACE DEFECTS:** 5% liners of sample size as given under clause 6.3.1 or minimum 5 Nos. shall be checked for freedom from surface defects and should be free from harmful surface defects within the description given in sub clause 7.1 & 7.2 of IS-2062: 2011. The sample liners shall be examined for surface flaws, laminations, rough/ jagged &imperfect edges etc. and other harmful defects by the macro etching process in hot acid.	**6.5 FREEDOM FROM SURFACE DEFECTS:** 5% liners of sample size as given under clause 6.3.1or minimum 5 Nos. shall be checked for freedom from surface defects and should be free from harmful surface defects within the description given in sub clause 7.1 & 7.2 of IS- 2062: 2011. The sample liners shall be examined for surface flaws, laminations, rough/ jagged & imperfect edges etc. and other harmful defects by the macro etching process in hot acid.	Nil	Nil	**6.5 FREEDOM FROM SURFACE DEFECTS:** 5% liners of sample size as given under clause 6.3.1or minimum 5 Nos. shall be checked for freedom from surface defects and should be free from harmful surface defects within the description given in sub clause 7.1 & 7.2 of IS-2062: 2011. The sample liners shall be examined for surface flaws, laminations, rough/ jagged & imperfect edges etc. and other harmful defects by the macro etching process in hot acid.
18.	**6.6 HARDNESS TEST:** 5% liners of sample size as given under clause 6.3.1 or minimum 5 Nos. shall be tested for hardness on the middle portion of the liner in	**6.6 HARDNESS TEST:** 5% liners of sample size as given under clause 6.3.1 or minimum 5 Nos. shall be tested for hardness on the middle portion of the liner in accordance with IS-1500-2005 and hardness test	Nil	Nil	**6.6 HARDNESS TEST:** 5% liners of sample size as given under clause 6.3.1 or minimum 5 Nos. shall be tested for hardness on the middle portion of the liner in accordance with IS-1500-2005 and hardness test

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	accordance with IS-1500-2005 and hardness test values should not be less than 115 HBW (BHN/HB/HBS).	values should not be less than 115 HBW (BHN/HB/HBS).			values should not be less than 115 HBW (BHN/HB/HBS).
19.	**6.7 INCLUSION CONTENT TEST:** 5% liners of sample size as given under clause 6.3.1 or minimum 5 Nos. shall be checked for inclusion rating in the material of metal liners. The inclusion rating when determined as per IS: 4163-2004 shall not be worse than 2.0 A, B, C, D both for thick & thin series when compared to the chart in Fig. 2 of IS: 4163-2004.	**6.7 INCLUSION CONTENT TEST:** 5% liners of sample size as given under clause 6.3.1 or minimum 5 Nos. shall be checked for inclusion rating in the material of metal liners. The inclusion rating when determined as per IS: 4163-2004 shall not be worse than 2.0 A, B, C, D both for thick & thin series when compared to the chart in Fig. 2 of IS: 4163-2004.	Nil	Nil	**6.7 INCLUSION CONTENT TEST:** 5% liners of sample size as given under clause 6.3.1 or minimum 5 Nos. shall be checked for inclusion rating in the material of metal liners. The inclusion rating when determined as per IS: 4163-2004 shall not be worse than 2.0 A, B, C, D both for thick & thin series when compared to the chart in Fig. 2 of IS: 4163-2004.
20.	**6.8 GRAIN SIZE TEST:** 5% liners of sample size as given under clause 6.3.1 or minimum 5 Nos. shall be checked for microstructure of the steel in the material of metal liners. The grain size when determined as per IS 4748:1988 should be fine grains ferrite and pearlite with grain size of ASTM-6 or finer.	**6.8 GRAIN SIZE TEST:** 5% liners of sample size as given under clause 6.3.1 or minimum 5 Nos. shall be checked for microstructure of the steel in the material of metal liners. The grain size when determined as per IS 4748:1988 should be fine grains ferrite and pearlite with grain size of ASTM-6 or finer.	Nil	Nil	**6.8 GRAIN SIZE TEST:** 5% liners of sample size as given under clause 6.3.1 or minimum 5 Nos. shall be checked for microstructure of the steel in the material of metal liners. The grain size when determined as per IS 4748:1988 should be fine grains ferrite and pearlite with grain size of ASTM-6 or finer.
21.	**WEIGHT TEST:** The sample of Metal Liner shall be checked for the weight by means of digital weighing machine, and shall meet with requirement of weight as given in Annexure-X and the results shall be recorded as per Annexure-XI of this standard. For weight test, the sample size and acceptance and rejection numbers for Inspection Level II and AQL 2.5 % shall be as per IS–2500 (Part-1):2000 and is summarized at Annexure VII of this standard.	**WEIGHT TEST:** The sample of Metal Liner shall be checked for the weight by means of digital weighing machine, and shall meet with requirement of weight as given in Annexure-X ~~and the results shall be recorded as per Annexure XI of this standard~~ .~~For weight test, the sample size and acceptance and rejection numbers for Inspection Level II and AQL 2.5 % shall be as per IS–2500 (Part-1):2000 and is summarized at Annexure VII of this standard.~~ Sampling plan as per IS–2500 (Part-1):2000 to be followed. For weight Test, the sample size and the acceptance & rejection number for inspection level II and AQL 2.5% shall be as per IS–2500 (Part-1):2000 and	Nil	Para has been modified	**WEIGHT TEST:** The sample of Metal Liner shall be checked for the weight by means of digital weighing machine, and shall meet with requirement of weight as given in Annexure-X ~~and the results shall be recorded as per Annexure XI of this standard~~ .~~For weight test, the sample size and acceptance and rejection numbers for Inspection Level II and AQL 2.5 % shall be as per IS–2500 (Part-1):2000 and is summarized at Annexure VII of this standard.~~ Sampling plan as per IS–2500 (Part-1):2000 to be followed. For weight Test, the sample size and the acceptance & rejection number for inspection level II and AQL 2.5% shall be as per IS–2500 (Part-1):2000 and is summarized at Annexure VII of this standard.

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		is summarized at Annexure VII of this standard.			
22.	**7.0 RE-TEST:** If any of the sample liner does not conform to the requirements of the tests stipulated in clause 6 other than chemical analysis, dimension check and weight test, twice the number of samples as stipulated therein shall be drawn at random from the same lot and tested for that particular test in which the samples are failed. If all the liners/ test samples so drawn are found to conform to the requirements of that test, the lot shall be accepted; otherwise the entire lot shall be rejected	**7.0 RE-TEST:** If any of the sample liner does not conform to the requirements of the tests stipulated in clause 6 other than chemical analysis, dimension check and weight test, twice the number of samples as stipulated therein shall be drawn at random from the same lot and tested for that particular test in which the samples are failed. If all the liners/ test samples so drawn are found to conform to the requirements of that test, the lot shall be accepted; otherwise the entire lot shall be rejected	Nil	Nil	**7.0 RE-TEST:** If any of the sample liner does not conform to the requirements of the tests stipulated in clause 6 other than chemical analysis, dimension check and weight test, twice the number of samples as stipulated therein shall be drawn at random from the same lot and tested for that particular test in which the samples are failed. If all the liners/ test samples so drawn are found to conform to the requirements of that test, the lot shall be accepted; otherwise the entire lot shall be rejected
23.	**8.0 PROTECTION:** After acceptance by the purchaser or his nominee, liners shall be painted with temporary corrosion preventive to IS-1153-2000in such a way that surface of the liner is covered properly with protective coating.	**8.0 PROTECTION: HOT DIP GALVANIZATION** ~~After acceptance by the purchaser or his nominee~~. The liners shall be galvanized ~~painted with temporary corrosion preventive to IS-1153-2000~~in such a way that surface of the liner is covered properly with protective coating as per the technical requirements for hot dip galvanizing of low carbon steel metal liner to IS:2062 given in Annexure–XII.	Nil	Para has been modified	**8.0 PROTECTION: HOT DIP GALVANIZATION** ~~After acceptance by the purchaser or his nominee~~. The liners shall be galvanized painted with temporary corrosion preventive to IS-1153-2000in such a way that surface of the liner is covered properly with protective coating as per the technical requirements for hot dip galvanizing of low carbon steel metal liner to IS:2062 given in Annexure–XII.
24.	**9.0 MARKING:** All the liners shall be punch marked with Lot No. distinctly along with other requirements of respective drawing of the liner. The liners shall also be marked with rail section and GS or NGS as the case be, to indicate use of liner on gauge face side or non-gauge face side of rail in track. Screen-printing as per drawing may also make distinction between GS and NGS liner. In case the purchaser desires to dispense with the screen printing on liners, this aspect shall have to be specifically mentioned in the purchase order / contract	**9.0 MARKING:** All the liners shall be punch marked with Lot No. distinctly along with other requirements of respective drawing of the liner. The liners shall also be marked with rail section and GS or NGS as the case be, to indicate use of liner on gauge face side or non-gauge face side of rail in track. Screen-printing as per drawing may also make distinction between GS and NGS liner. In case the purchaser desires to dispense with the screen printing on liners, this aspect shall have to be specifically mentioned in the purchase order / contract by the purchasing authority	Nil	Nil	**9.0 MARKING:** All the liners shall be punch marked with Lot No. distinctly along with other requirements of respective drawing of the liner. The liners shall also be marked with rail section and GS or NGS as the case be, to indicate use of liner on gauge face side or non-gauge face side of rail in track. Screen-printing as per drawing may also make distinction between GS and NGS liner. In case the purchaser desires to dispense with the screen printing on liners, this aspect shall have to be specifically mentioned in the purchase order / contract by the purchasing authority

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	by the purchasing authority.				
25.	**10.0 PACKING:** The liner shall be packed in double gunny / plastic bags. Each bag shall contain not more than 200 liners. Each bag shall be marked distinctly with lot No. followed by bag No. of that lot i.e. L-1/1 to L-1/200 etc on the bag. The packing shall ensure that there is no loss or damage to the liners in transit.	**10.0 PACKING:** The liner shall be packed in double gunny / plastic bags. Each bag shall contain not more than 200 liners. Each bag shall be marked distinctly with lot No. followed by bag No. of that lot i.e. L-1/1 to L-1/200 etc on the bag. The packing shall ensure that there is no loss or damage to the liners in transit.	Nil	Nil	**10.0 PACKING:** The liner shall be packed in double gunny / plastic bags. Each bag shall contain not more than 200 liners. Each bag shall be marked distinctly with lot No. followed by bag No. of that lot i.e. L-1/1 to L-1/200 etc on the bag. The packing shall ensure that there is no loss or damage to the liners in transit.
26.	**11.0 TEST FACILITIES:** The manufacturer shall install all the essential testing facilities for carrying out chemical analysis and physical testing along with other accessories required for inspection in a separate, well lit, clean and properly ventilated laboratory in their own premises. However, Chemical Analysis test by spectrograph method may be done at Govt. owned/NABL accredited/ RDSO approved lab.	**11.0 TEST FACILITIES:** The manufacturer shall install all the essential testing facilities for carrying out chemical analysis and physical testing along with other accessories required for inspection in a separate, well lit, clean and properly ventilated laboratory in their own premises. However, Chemical Analysis test by spectrograph method may be done at Govt. owned/NABL accredited/Govt.approved lab.	Nil	Nil	**11.0 TEST FACILITIES:** The manufacturer shall install all the essential testing facilities for carrying out chemical analysis and physical testing along with other accessories required for inspection in a separate, well lit, clean and properly ventilated laboratory in their own premises. However, Chemical Analysis test by spectrograph method may be done at Govt. owned/NABL accredited/ Govt. approved lab.
27	**12.0 DISPOSAL OF REJECTED MATERIAL**: The rejected liners shall be cut into two pieces to make it unusable.	**12.0 DISPOSAL OF REJECTED MATERIAL**: The rejected liners shall be cut into two pieces to make it unusable..	Nil	Nil	**12.0 DISPOSAL OF REJECTED MATERIAL**: The rejected liners shall be cut into two pieces to make it unusable.
28.	**13.0 REPORT:** The inspecting officer shall report the test observations in the format given in Annexure II to VI	**13.0 REPORT:** The inspecting officer shall report the test observations in the format given in Annexure II to VI & XI.	Nil	Para has been modified	**13.0 REPORT:** The inspecting officer shall report the test observations in the format given in Annexure II to VI & XI.
29.	**14.0 GENERAL:**	**14.0 GENERAL:**			**14.0 GENERAL:**
30.	14.1 The liner manufacturer shall furnish at his cost the liners/test specimen required for all tests and shall provide necessary manpower along with required facilities for carrying out tests at his works.	14.1 The liner manufacturer shall furnish at his cost the liners/test specimen required for all tests and shall provide necessary manpower along with required facilities for carrying out tests at his works.	**Nil**	**Nil**	14.1 The liner manufacturer shall furnish at his cost the liners/test specimen required for all tests and shall provide necessary manpower along with required facilities for carrying out tests at his works.

SN	Exiting clause of IRS Specification Sl. No T-56 – 2020	Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)	Comments Received from Firms	RDSO's Remarks	Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)
31.	**14.2** Purchaser/Inspecting officer or his representative shall have free access to the works of manufacturer at all reasonable times and shall be at liberty to inspect the manufacture at any stage including calling for records pertaining to raw material, manufacturing process, quality control etc. which shall be made available to him within reasonable time.	**14.2** Purchaser/Inspecting authority or his representative shall have free access to the works of manufacturer at all reasonable times and shall be at liberty to inspect the manufacture at any stage including calling for records pertaining to raw material, manufacturing process, quality control etc. which shall be made available to him within reasonable time.	Nil	Nil.	**14.2** Purchaser/Inspecting authority or his representative shall have free access to the works of manufacturer at all reasonable times and shall be at liberty to inspect the manufacture at any stage including calling for records pertaining to raw material, manufacturing process, quality control etc. which shall be made available to him within reasonable time.
32	14.3 The material shall be offered for inspection as per letter of offer given at Annexure–VIII.	14.3 The material shall be offered for inspection as per letter of offer given at Annexure–VIII.	Nil	Nil	14.3 The material shall be offered for inspection as per letter of offer given at Annexure–VIII.
~~33.~~	**ANNEXURE-I** **A : ~~SCHEME OF TESTING FOR PRE-ACCEPTANCE TEST FOR METAL LINERS~~:Deleted** ~~S.No. / Property / No. of samples to be tested / Criteria value for acceptance / No. of samples to be drawn~~ ~~1. / Chemical analysis / 3 / Each sample must clear the test / 3~~	ANNEXURE-I **~~A: SCHEME OF TESTING FOR PRE-ACCEPTANCE TEST FOR METAL LINERS:Deleted~~** ~~S.No. / Property / No. of samples to be / Criteria value for / No. of samples to~~ ~~1. / Chemical analysis / 3 / Each sample must clear the test / 3~~	**Nil**	Test properties of A : Scheme of Testing for Pre-Acceptance Test for Metal Liners of Annexure-I	**Deleted**

SN	Exiting clause of IRS Specification Sl. No T-56 – 2020					Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)					Comments Received from Firms	RDSO's Remarks	Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)
												has been deleted because the item has been decontrolled	
						~~2.~~	~~Tensile strength*~~	~~3~~	~~-do-~~	~~5~~			
	~~2.~~	~~Tensile strength*~~	~~3~~	~~-do-~~	~~5~~	~~3.~~	~~Bend Test~~ ~~*~~	~~3~~	~~-do-~~	~~5~~			
	~~3.~~	~~Bend Test~~ ~~*~~	~~3~~	~~-do-~~	~~5~~	~~4.~~	~~Surface Defects~~	~~5~~	~~-do-~~	~~5~~			
	~~4.~~	~~Surface Defects~~	~~5~~	~~-do-~~	~~5~~	~~5.~~	~~Hardness~~	~~3~~	~~-do-~~	~~Test shall be conducted on samples drawn for Surface Defects test~~			
	~~5.~~	~~Hardness~~	~~3~~	~~-do-~~	~~Test shall be conducted on samples drawn for Surface Defects test~~								
	~~6.~~	~~Inclusion conten~~	~~3~~	~~-do-~~	~~Test shall be~~	~~6.~~	~~Inclusion conte~~	~~3~~	~~-do-~~	~~Test shall be conduct~~			

SN	Exiting clause of IRS Specification Sl. No T-56 – 2020	Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)	Comments Received from Firms	RDSO's Remarks	Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)

	~~t~~			~~conducted on samples drawn for Surface Defects test~~
~~7.~~	~~Grain size~~	~~3~~	~~-do-~~	~~Test shall be conducted on samples drawn for Surface Defects test~~
~~8.~~	~~Dimensions~~	~~8~~	~~-do-~~	~~8~~

~~Note: Total number of samples of the metal liners shall be 16 along with 5 No. test specimens each of tensile and bend test.~~
~~*The tests to be conducted on specially prepared test specimen~~

	~~nt~~			~~ed on samples drawn for Surface Defects test~~
~~7.~~	~~Grain size~~	~~3~~	~~-do-~~	~~Test shall be conducted on samples drawn for Surface Defects test~~
~~8.~~	~~Dimensions~~	~~8~~	~~-do-~~	~~8~~

~~Note: Total number of samples of the metal liners shall be 16 along with 5 No. test specimens each of tensile and bend test.~~
~~*The tests to be conducted on specially prepared test specimen~~

<table>
<tr><th>SN</th><th>Exiting clause of IRS Specification Sl. No T-56 – 2020</th><th>Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)</th><th>Comments Received from Firms</th><th>RDSO's Remarks</th><th>Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)</th></tr>
<tr><td></td><td>B : SCHEME OF TESTING FOR ACCEPTANCE TEST FOR METAL LINERS
<table>
<tr><th>S. No.</th><th>Property</th><th>No. of samples to be tested</th><th>Criteria value for acceptance/ Rejection</th><th>No. of samples to be drawn</th></tr>
<tr><td>1.</td><td>Chemical analysis</td><td>3</td><td>Each sample must clear the test</td><td>3</td></tr>
<tr><td>2.</td><td>Tensile strength*</td><td>3</td><td>-do-</td><td>3</td></tr>
<tr><td>3.</td><td>Bend Test*</td><td>3</td><td>-do-</td><td>3</td></tr>
<tr><td>4.</td><td>Surface Defects</td><td>As per clause 6.5</td><td>-do-</td><td>As per clause 6.5</td></tr>
<tr><td>5.</td><td>Hardness</td><td>As per clause 6.6</td><td>-do-</td><td>Test shall be conducted on</td></tr>
</table></td><td>~~B~~– A : SCHEME OF TESTING FOR ACCEPTANCE TEST FOR METAL LINERS
<table>
<tr><th>S. No.</th><th>Property</th><th>No. of samples to be tested</th><th>Criteria value for acceptance</th><th>No. of samples to be drawn</th></tr>
<tr><td>1.</td><td>Chemical analysis</td><td>3</td><td>Each sample must clear the test</td><td>3</td></tr>
<tr><td>2.</td><td>Tensile strength*</td><td>3</td><td>-do-</td><td>3</td></tr>
<tr><td>3.</td><td>Bend Test*</td><td>3</td><td>-do-</td><td>3</td></tr>
<tr><td>4.</td><td>Surface Defects</td><td>As per clause 6.5</td><td>-do-</td><td>As per clause 6.5</td></tr>
<tr><td>5.</td><td>Hardness</td><td>As per clause 6.6</td><td>-do-</td><td>Test shall be conducted on sample</td></tr>
</table></td><td></td><td></td><td>~~B~~ A : SCHEME OF TESTING FOR ACCEPTANCE TEST FOR METAL LINERS
<table>
<tr><th>S. No.</th><th>Property</th><th>No. of samples to be</th><th>Criteria value for accepta</th><th>No. of samples</th></tr>
<tr><td>1.</td><td>Chemical analysis</td><td>3</td><td>Each sample must clear the test</td><td>3</td></tr>
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<tr><td>3.</td><td>Bend Test*</td><td>3</td><td>-do-</td><td>3</td></tr>
<tr><td>4.</td><td>Surface Defects</td><td>As per clause 6.5</td><td>-do-</td><td>As per clause 6.5</td></tr>
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SN	Exiting clause of IRS Specification Sl. No T-56 – 2020					Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)					Comments Received from Firms	RDSO's Remarks	Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)				
					samples drawn for Surface Defects test					s drawn for Surface Defects test							samples drawn for Surface Defects test
	6.	Inclusion content	As per clause 6.7	-do-	Test shall be conducted on samples drawn for Surface Defects test	6.	Inclusion content	As per clause 6.7	-do-	Test shall be conducted on samples drawn for Surface Defects test			6.	Inclusion content	As per clause 6.7	-do-	Test shall be conducted on samples drawn for Surface Defects test
	7.	Grain size	As per clause 6.8	-do-	Test shall be conducted on samples drawn for Surface	7.	Grain size	As per clause 6.8	-do-	Test shall be conducted on samples drawn for Surface Defects test			7.	Grain size	As per clause 6.8	-do-	Test shall be conducted on samples drawn for Surface

SN	Exiting clause of IRS Specification Sl. No T-56 – 2020	Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)	Comments Received from Firms	RDSO's Remarks	Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)

Exiting clause of IRS Specification Sl. No T-56 – 2020

				Defects test
8.	Dimensions	As per IS-2500 (Part-1):2000	-do-	As per IS-2500 (Part-1):2000
9.	Charpy Impact Test*	3	-do-	3
10	Weight Test	As per IS - 2500 (Part-1): 2000	-do-	As per IS - 2500 (Part-1): 2000

Note: The samples for tensile, and bend test and Charpy Impact Test shall be made from the raw material of the same lot at the time of manufacture of liner and preserved lot wise by the firm. An undertaking shall be given by manufacturer to inspecting official in this regard.

*The tests to be conducted on specially prepared test specimens

Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)

8.	Dimensions	As per IS-2500 (Part-1):2000	-do-	As per IS-2500 (Part-1):2000
9.	Charpy Impact Test*	3	-do-	3
10	Weight Test	As per IS - 2500 (Part-1): 2000	-do-	As per IS - 2500 (Part-1): 2000

Note: Thesamples for tensile, and bend test and Charpy Impact Test shall be made from the raw material of the same lot at the time of manufacture of liner and preserved lot wise by the firm. An undertaking shall be given by manufacturer to inspecting official in this regard.

*The tests to be conducted on specially prepared test specimens

Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)

				Defects test
8.	Dimensions	As per IS-2500 (Part-1):2000	-do-	As per IS-2500 (Part-1):2000
9.	Charpy Impact Test*	3	-do-	3
10	Weight Test	As per IS - 2500 (Part-1): 2000	-do-	As per IS -2500 (Part-1): 2000

Note: The samples for tensile, and bend test and Charpy Impact Test shall be made from the raw material of the same lot at the time of manufacture of liner and preserved lot wise by the firm. An undertaking shall be given by manufacturer to inspecting official in this regard.

*The tests to be conducted on specially prepared test specimens

<table>
<tr><th>SN</th><th>Exiting clause of IRS Specification Sl. No T-56 – 2020</th><th>Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)</th><th>Comments Received from Firms</th><th>RDSO's Remarks</th><th>Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>34</td><td>Annexure - II
TEST RESULTS - CHEMICAL ANALYSIS
1. Name of firm: M/s
2. Firm's offer letter no. :
3. Liner to Drg. No. :
4. Qty. on order:
5. …….Rly. P.O. No. :
<table><tr><th rowspan="2">S. No.</th><th rowspan="2">Heat No.</th><th rowspan="2">Lot No.</th><th rowspan="2">Quantity (Nos.)</th><th rowspan="2">Sample size</th><th colspan="5">*Chemical analysis (%)</th><th rowspan="2">Inclusion Rating</th><th rowspan="2">Grain Size</th><th rowspan="2">Accepted / Not Accepted</th></tr><tr><th>C</th><th>Mn</th><th>Si</th><th>S</th><th>P</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>*Remark: Variation over and above ladle analysis shall be as per clause 6.2 of the specification.
Signature of
inspecting authorityFirm's representative</td><td>Annexure - II
TEST RESULTS - CHEMICAL ANALYSIS
1. Name of firm: M/s
2. Firm's offer letter no. :
3. Liner to Drg. No. :
4. Qty. on order:
5. …….Rly. P.O. No. :
<table><tr><th rowspan="2">S. No.</th><th rowspan="2">Heat No.</th><th rowspan="2">Lot No.</th><th rowspan="2">Quantity (Nos.)</th><th rowspan="2">Sample size</th><th colspan="5">*Chemical aalysis (%)</th><th rowspan="2">Inclusion Rating</th><th rowspan="2">Grain Size</th><th rowspan="2">Accepted / Not Accepted</th></tr><tr><th>C</th><th>Mn</th><th>Si</th><th>S</th><th>P</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>*Remark: Variation over and above ladle analysis shall be as per clause 6.2 of the specification.
Signature of
inspecting authorityFirm's representative</td><td>NIL</td><td>NIL</td><td>Annexure - II
TEST RESULTS - CHEMICAL ANALYSIS
6. Name of firm: M/s
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8. Liner to Drg. No. :
9. Qty. on order:
10. …….Rly. P.O. No. :
<table><tr><th rowspan="2">S. No.</th><th rowspan="2">Heat No.</th><th rowspan="2">Lot No.</th><th rowspan="2">Quantity (Nos.)</th><th rowspan="2">Sample size</th><th colspan="5">*Chemical analysis (%)</th><th rowspan="2">Inclusion Rating</th><th rowspan="2">Grain Size</th><th rowspan="2">Accepted / Not Accepted</th></tr><tr><th>C</th><th>Mn</th><th>Si</th><th>S</th><th>P</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>*Remark: Variation over and above ladle analysis shall be as per clause 6.2 of the specification.
Signature of
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SN	Exiting clause of IRS Specification Sl. No T-56 – 2020	Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)	Comments Received from Firms	RDSO's Remarks	Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)
35	**Annexure - III** **TEST RESULTS – DIMENSIONS** **1.** Name of firm: M/s **2.** Firm's offer letter no. : **3.** Liner to drg. no. : **4.** Qty. on order: **5.** ….Rly. P.O. no. : Signature of inspecting authority Firm's representative	**Annexure - III** **TEST RESULTS – DIMENSIONS** 1. Name of firm: M/s 2. Firm's offer letter no. : 3. Liner to drg. no. : 4. Qty. on order: 5. ….Rly. P.O. no. : Signature of inspecting authority Firm's representative	NIL	NIL	**Annexure - III** **TEST RESULTS – DIMENSIONS** 1. Name of firm: M/s 2. Firm's offer letter no. : 3. Liner to drg. no. : 4. Qty. on order: 5. ….Rly. P.O. no. : Signature of inspecting authority Firm's representative

. No.	Heat No.	Lot No.	Quantity (Nos.)	Sample size	Dimension as per approved gauges		Total No. of defective s	Accepted /Not Accepted
					Failing in assembly gauges	GO/NO GO dimensio		

SN	Exiting clause of IRS Specification Sl. No T-56 – 2020	Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)	Comments Received from Firms	RDSO's Remarks	Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)
36.	**Annexure - IV** **TEST RESULTS - TENSILE TEST & BEND TEST** 1. Name of firm: M/s. 2. Firm's offer letter no.: 3. Liner to Drg. No.: 4. Qty. on order: 5. . …. Rly. P.O. No: S. No. / Heat No. / Lot NNos.o. / Quality () / Sample size / Size of dumb bell (Width (mm) / Thickness (mm) / Area (.mm Sq.)) / Yield load (N) / Ultimate load (N) / Gauge length (mm) / Elongated length (mm) / Tensile strength (410 MPa) Min. / Yield stress min. (250 MPa) / % Elongation with min. gauge length= / Tensile Test OK / NOT OK / Bend Test OK / NOT OK Signature of inspecting authorityFirm's representative	Annexure - IV TEST RESULTS - TENSILE TEST & BEND TEST 1. Name of firm: M/s. 2. Firm's offer letter No: 3. Liner to Drg. No.: 4. Qty on order 5. …….. Rly P.O. No. ~~S. No~~ / ~~Heat No.~~ / ~~Lot NNos.o.~~ / ~~Quality ()~~ / ~~Sample size~~ / Size of dumb bell (~~Width (mm)~~ / ~~Thickness (mm)~~ / ~~Area (.mm Sq.)~~) / ~~Yield load (N)~~ / ~~Ultimate load (N)~~ / ~~Gauge length (mm)~~ / ~~Elongated length (mm)~~ / ~~Tensile strength (410 MPa) Min.~~ / ~~Yield stress min. (250 MPa)~~ / ~~% Elongation with min. gauge lengths= 5.65 √So (23%~~ / ~~Tensile Test OK / NOT OK~~ / ~~Bend Test OK / NOT OK~~ Signature of inspecting authority Firm's representative	NIL	NIL	Annexure - IV TEST RESULTS - TENSILE TEST & BEND TEST 1. Name of firm: M/s. 2. Firm's offer letter No: 3. Liner to Drg. No.: 4. Qty on order 5. …….. Rly P.O. No. S. No. / Heat No. / Lot NNos.o. / Quality () / Sample size / Size of dumb bell (Width (mm) / Thickness (mm) / Area (.mm Sq.)) / Yield load (N) / Ultimate load (N) / Gauge length (mm) / Elongated length (mm) / Tensile strength (410 MPa) Min. / Yield stress min. (250 MPa) / % Elongation with min. gauge length= / Tensile Test OK / NOT OK / Bend Test OK / NOT OK / Accepted / Not Accepted Signature of inspecting authority Firm's representative

<table>
<tr><th>SN</th><th>Exiting clause of IRS Specification Sl. No T-56 – 2020</th><th>Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)</th><th>Comments Received from Firms</th><th>RDSO's Remarks</th><th>Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)</th></tr>
<tr><td>37</td><td>Annexure - V

TEST RESULTS – FREEDOM FROM SURFACE DEFECT
1. Name of firm: M/s.
2. Firm's offer letter no.:
3. Liner to Drg. No.:
4. Qty. on order:
5. . …. Rly. P.O. No:

<table><tr><th>S.No</th><th>Heat No</th><th>Lot No</th><th>Quantity(Nos)</th><th>Sample Size</th><th>Freedom from surface defects OK/Not OK</th><th>No of defectives</th><th>Accepted/Not Accepted</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>Signature of

inspecting authority Firm's representative</td><td>Annexure - V

TEST RESULTS – FREEDOM FROM SURFACE DEFECT
1. Name of firm: M/s.
2. Firm's offer letter no.:
3. Liner to Drg. No.:
4. Qty. on order:
5. . …. Rly. P.O. No:

<table><tr><th>S.No</th><th>Heat No</th><th>Lot No</th><th>Quantity(Nos)</th><th>Sample Size</th><th>Freedom from surface defects OK/Not OK</th><th>No of defectives</th><th>Accepted/Not Accepted</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>Signature of

inspecting authority Firm's representative</td><td>NIL</td><td>NIL</td><td>Annexure - V

TEST RESULTS – FREEDOM FROM SURFACE DEFECT
1. Name of firm: M/s.
2. Firm's offer letter no.:
3. Liner to Drg. No.:
4. Qty. on order:
5. . …. Rly. P.O. No:

<table><tr><th>S.No</th><th>Heat No</th><th>Lot No</th><th>Quantity(Nos)</th><th>Sample Size</th><th>Freedom from surface defects OK/Not OK</th><th>No of defectives</th><th>Accepted/Not Accepted</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>Signature of

inspecting authority Firm's representative</td></tr>
<tr><td>38.</td><td>Annexure - VI

TEST RESULTS –HARDNESS TEST
1. Name of firm: M/s.
2. Firm's offer letter no.:
3. Liner to Drg. No.:
4. Qty. on order:
5. . …. Rly. P.O. No:</td><td>Annexure - VI

TEST RESULTS –HARDNESS TEST
1. Name of firm: M/s.
2. Firm's offer letter no.:
3. Liner to Drg. No.:
4. Qty. on order:
5. . …. Rly. P.O. No:</td><td>NIL</td><td>NIL</td><td>Annexure - VI

TEST RESULTS –HARDNESS TEST
1. Name of firm: M/s.
2. Firm's offer letter no.:
3. Liner to Drg. No.:
4. Qty. on order:
5. . …. Rly. P.O. No:</td></tr>
</table>

<table>
<tr><th>SN</th><th>Exiting clause of IRS Specification Sl. No T-56 – 2020</th><th>Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)</th><th>Comments Received from Firms</th><th>RDSO's Remarks</th><th>Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)</th></tr>
<tr><td></td><td>
<table>
<tr><th>S.No</th><th>Heat No</th><th>Lot No</th><th>Quantity(Nos)</th><th>Sample Size</th><th>Hardness value(115 HBW Min)</th><th>No of defectives</th><th>Accepted/Not Accepted</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Signature of
inspecting authority Firm's representative</td><td>
<table>
<tr><th>S.No</th><th>Heat No</th><th>Lot No</th><th>Quantity(Nos)</th><th>Sample Size</th><th>Hardness value(115 HBW Min)</th><th>No of defectives</th><th>Accepted/Not Accepted</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Signature of
inspecting authority Firm's representative</td><td></td><td></td><td>
<table>
<tr><th>S.No</th><th>Heat No</th><th>Lot No</th><th>Quantity(Nos)</th><th>Sample Size</th><th>Hardness value(115 HBW Min)</th><th>No of defectives</th><th>Accepted/Not Accepted</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Signature of
inspecting authority Firm's representative</td></tr>
<tr><td>39.</td><td>ANNEXURE-VII
(IRS specification of T-56-2020)
DOUBLE SAMPLING PLAN
General Inspection Level-II
(Refer: Table I & 3A of IS 2500 Part I – 2000)
<table>
<tr><th rowspan="2">Lot size</th><th rowspan="2">Sample size code letter</th><th rowspan="2">Sample</th><th rowspan="2">Sample Size</th><th rowspan="2">Cumulative sample</th><th colspan="2">Accepted quality level Percent defectives-2.5</th></tr>
<tr><th>Acceptance No. (a)</th><th>Rejection No. (r)</th></tr>
</table></td><td>ANNEXURE-VII
(IRS specification of T-56-~~2020~~-2024)
DOUBLE SAMPLING PLAN
General Inspection Level-II
(Refer: Table I & 3A of IS 2500 Part I – 2000)
<table>
<tr><th rowspan="2">Lot size</th><th rowspan="2">Sample size code letter</th><th rowspan="2">Sample</th><th rowspan="2">Sample Size</th><th rowspan="2">Cumulative sample</th><th colspan="2">Accepted quality level Percent defectives-2.5</th></tr>
<tr><th>Acceptance No. (a)</th><th>Rejection No. (r)</th></tr>
</table></td><td>NIL</td><td>Note's Serial has been corrected .</td><td>ANNEXURE-VII
(IRS specification of T-56-~~2020~~-2024)
DOUBLE SAMPLING PLAN
General Inspection Level-II
(Refer: Table I & 3A of IS 2500 Part I – 2000)
<table>
<tr><th rowspan="2">Lot size</th><th rowspan="2">Sample size code letter</th><th rowspan="2">Sample</th><th rowspan="2">Sample Size</th><th rowspan="2">Cumulative sample</th><th colspan="2">Accepted quality level Percent defectives-2.5</th></tr>
<tr><th>Acceptance No. (a)</th><th>Rejection No. (r)</th></tr>
</table></td></tr>
</table>

SN	Exiting clause of IRS Specification Sl. No T-56 – 2020	Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)	Comments Received from Firms	RDSO's Remarks	Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)

281-500	H	FIRST	32	32	1	3
		SECOND	32	64	4	5
501-1200	J	FIRST	50	50	2	5
		SECOND	50	100	6	7
1201-3200	K	FIRST	80	80	3	6
		SECOND	80	160	9	10
3201-10000	L	FIRST	125	125	5	9
		SECOND	125	250	12	13
10001-35000	M	FIRST	200	200	7	11
		SECOND	200	400	18	19

Notes:

(ii) For any other lot size less than 281, reference may be made to table I & 3-A of IS2500 (Part I)-2000 for sample size, acceptance and rejection numbers.

(iii) In the first sample if the number of failed pieces is equal to the acceptance number (a), the lot shall be accepted. If number of failed pieces is equal to or more than rejection number (r), the lot shall be rejected.

(iv) If the failed pieces exceeds the acceptance number (a), but less than the rejection number (r), the second sample should be considered.

281-500	H	FIRST	32	32	1	3
		SECOND	32	64	4	5
501-1200	J	FIRST	50	50	2	5
		SECOND	50	100	6	7
1201-3200	K	FIRST	80	80	3	6
		SECOND	80	160	9	10
3201-10000	L	FIRST	125	125	5	9
		SECOND	125	250	12	13
10001-35000	M	FIRST	200	200	7	11
		SECOND	200	400	18	19

Notes:

~~ii)~~ (i) For any other lot size less than 281, reference may be made to table I & 3-A of IS2500 (Part I)-2000 for sample size, acceptance and rejection numbers.

~~iii)~~ (ii) In the first sample if the number of failed pieces is equal to the acceptance number (a), the lot shall be accepted. If number of failed pieces is equal to or more than rejection number (r), the lot shall be rejected.

~~(iv)~~ (iii) If the failed pieces exceeds the acceptance number (a), but less than the rejection number (r), the second sample should be considered.

281-500	H	FIRST	32	32	1	3
		SECOND	32	64	4	5
501-1200	J	FIRST	50	50	2	5
		SECOND	50	100	6	7
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3201-10000	L	FIRST	125	125	5	9
		SECOND	125	250	12	13
10001-35000	M	FIRST	200	200	7	11
		SECOND	200	400	18	19

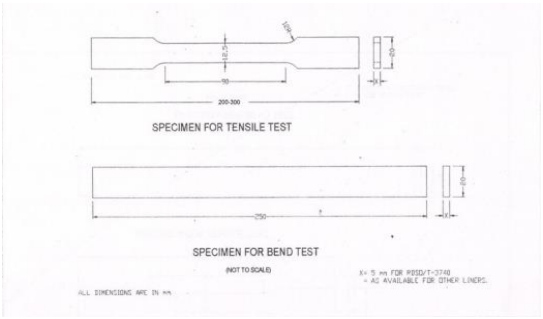
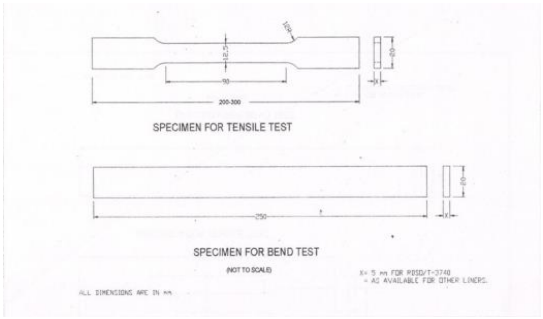
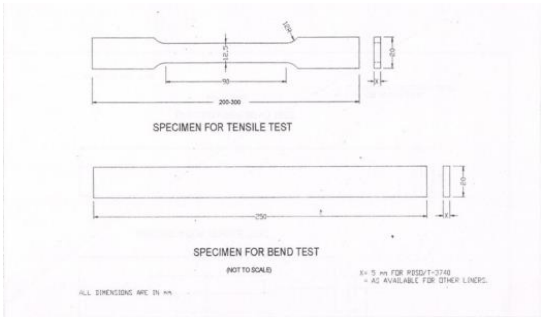
Notes:

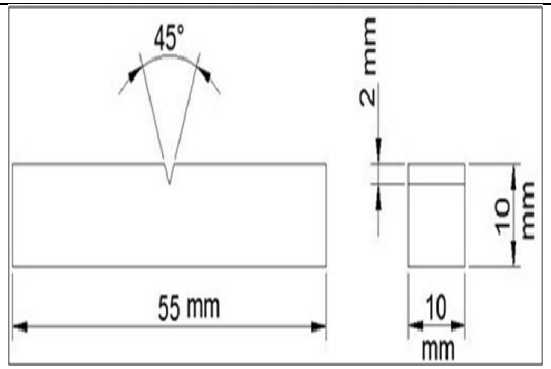
(i) For any other lot size less than 281, reference may be made to table I & 3-A of IS2500 (Part I)-2000 for sample size, acceptance and rejection numbers.

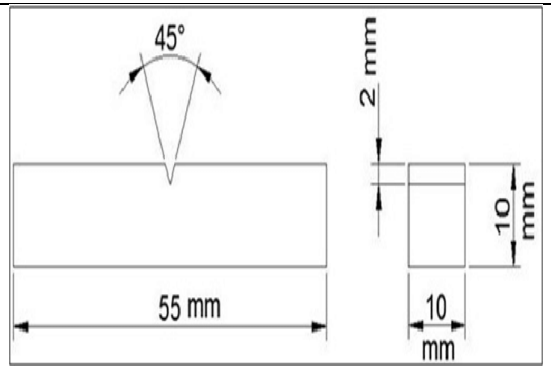
(ii) In the first sample if the number of failed pieces is equal to the acceptance number (a), the lot shall be accepted. If number of failed pieces is equal to or more than rejection number (r), the lot shall be rejected.

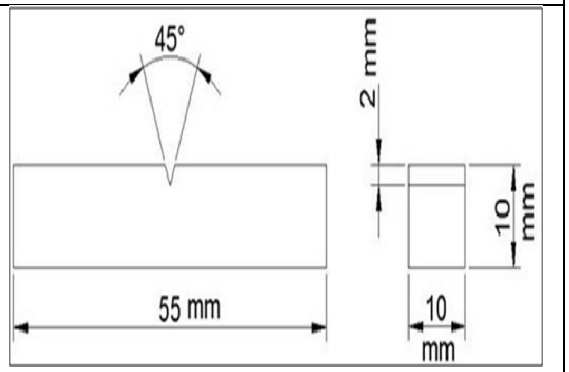
(iii) If the failed pieces exceeds the acceptance number (a), but less than the rejection number (r), the second sample should be considered.

SN	Exiting clause of IRS Specification Sl. No T-56 – 2020	Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)	Comments Received from Firms	RDSO's Remarks	Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)
	(v) If the cumulative failed pieces equal or exceed the rejection number (r), the lot shall be rejected. The cumulative failed pieces are the total number of failed pieces in the first and second samples.	~~(v)~~ (iv) If the cumulative failed pieces equal or exceed the rejection number (r), the lot shall be rejected. The cumulative failed pieces are the total number of failed pieces in the first and second samples.			(iv) If the cumulative failed pieces equal or exceed the rejection number (r), the lot shall be rejected. The cumulative failed pieces are the total number of failed pieces in the first and second samples
40.	ANNEXURE-VIII (IRS specification of T-56-2020) **LETTER OF OFFER FROM THE FIRM** To, (Address of inspecting agency) Sub: Call letter for inspection of metal liner to drg. no. RDSO/T Ref … Railway's/ Railway Board's P.O. No. ……. dated ….. for metal liner to drg. no. RDSO/T-……. The metal liners as per following details are offered for inspection in terms of the above referred purchase order. These liners have been internally checked and found satisfactory as per drawing no. RDSO/ T- …… and relevant IRS specification. All burrs on liners are also properly removed. Copy of internal test result is enclosed. 1. Installment No. 2. Quantity on order a) Against original order b) Against extension 3. Quantity previously inspected and passed. 4. Quantity now offered for inspection a) Against original order b) Against extension 5. Batch /Lot Nos. 6. Corresponding cast/heat no. of raw material and its source of procurement	ANNEXURE-VIII (IRS specification of T-56-~~2020~~-2024) **LETTER OF OFFER FROM THE FIRM** To, (Address of inspecting agency) Sub: Call letter for inspection of metal liner to drg. no. RDSO/T Ref … Railway's/ Railway Board's P.O. No. ……. dated ….. for metal liner to drg. no. RDSO/T-……. The metal liners as per following details are offered for inspection in terms of the above referred purchase order. These liners have been internally checked and found satisfactory as per drawing no. RDSO/ T- …… and relevant IRS specification. All burrs on liners are also properly removed. Copy of internal test result is enclosed. 1. Installment No. 2. Quantity on order a) Against original order b) Against extension 3. Quantity previously inspected and passed. 4. Quantity now offered for inspection a) Against original order b) Against extension 5. Batch /Lot Nos. 6. Corresponding cast/heat no. of raw material and its source of procurement	NIL	NIL	ANNEXURE-VIII (IRS specification of T-56-~~2020~~-2024) **LETTER OF OFFER FROM THE FIRM** To, (Address of inspecting agency) Sub: Call letter for inspection of metal liner to drg. no. RDSO/T Ref … Railway's/ Railway Board's P.O. No. ……. dated ….. for metal liner to drg. no. RDSO/T-……. The metal liners as per following details are offered for inspection in terms of the above referred purchase order. These liners have been internally checked and found satisfactory as per drawing no. RDSO/ T- …… and relevant IRS specification. All burrs on liners are also properly removed. Copy of internal test result is enclosed. 1. Installment No. 2. Quantity on order a) Against original order b) Against extension 3. Quantity previously inspected and passed. 4. Quantity now offered for inspection a) Against original order b) Against extension 5. Batch /Lot Nos. 6. Corresponding cast/heat no. of raw material and its source of procurement

SN	Exiting clause of IRS Specification Sl. No T-56 – 2020	Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)	Comments Received from Firms	RDSO's Remarks	Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)
	7. Rate per liner. 8. Marking on liners 9. Delivery period a) Original b) Extended c) Letter no. (for extension) 10. Consignee 11. Consignee letter of authority no. 12. Packing 13. Test certificate No. of raw material 14. Rolled section of Metal liner bar supplied by Yours faithfully	7. Rate per liner. 8. Marking on liners 9. Delivery period a) Original b) Extended c) Letter no. (for extension) 10. Consignee 11. Consignee letter of authority no. 12. Packing 13. Test certificate No. of raw material 14. Rolled section of Metal liner bar supplied by Yours faithfully			7. Rate per liner. 8. Marking on liners 9. Delivery period a) Original b) Extended c) Letter no. (for extension) 10. Consignee 11. Consignee letter of authority no. 12. Packing 13. Test certificate No. of raw material 14. Rolled section of Metal liner bar supplied by Yours faithfully
41	Annexure-IX (IRS Specification of T-56-2020) 	Annexure-IX (IRS Specification of T-56-~~2020~~-2024) 	NIL	NIL	Annexure-IX (IRS Specification of T-56-~~2020~~-2024) 

<table>
<tr><th>SN</th><th>Exiting clause of IRS Specification Sl. No T-56 – 2020</th><th>Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)</th><th>Comments Received from Firms</th><th>RDSO's Remarks</th><th>Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)</th></tr>
<tr><td></td><td> 

SPECIMEN FOR CHARPY IMPACT TEST NOT TO SCALE</td><td> 

SPECIMEN FOR CHARPY IMPACT TEST NOT TO SCALE</td><td></td><td></td><td> 

SPECIMEN FOR CHARPY IMPACT TEST NOT TO SCALE</td></tr>
<tr><td>42.</td><td>Annexure X
(IRS Specification of T-56-2020)

Minimum Weight of Metal Liners for use with Elastic Rail Clips
<table>
<tr><th>SN</th><th>Drawing No.</th><th>Minimum Weight of Metal Liner (gm)</th></tr>
<tr><td>1</td><td>RDSO/T-3740</td><td>261</td></tr>
<tr><td>2</td><td>RDSO/T-3741</td><td>366</td></tr>
<tr><td>3</td><td>RDSO/T-3742</td><td>481</td></tr>
<tr><td>4</td><td>RDSO/T-8616</td><td>333</td></tr>
<tr><td>5</td><td>RDSO/T-8617</td><td>399</td></tr>
<tr><td>6</td><td>RDSO/T-8748</td><td>294</td></tr>
<tr><td>7</td><td>RDSO/T-8749</td><td>362</td></tr>
<tr><td>8</td><td>RDSO/T-</td><td>479</td></tr>
</table></td><td>Annexure X
(IRS Specification of T-56-~~2020~~-2024)

Minimum Weight of Metal Liners for use with Elastic Rail Clips
<table>
<tr><th>SN</th><th>Drawing No.</th><th>Minimum Weight of Metal Liner (gm)</th><th>Minimum Weight of Metal Liner with Galvanization(gm)</th></tr>
<tr><td>1</td><td>RDSO/T-3740</td><td>261</td><td>269.55</td></tr>
<tr><td>2</td><td>RDSO/T-3741</td><td>366</td><td>375.28</td></tr>
<tr><td>3</td><td>RDSO/T-3742</td><td>481</td><td>491.45</td></tr>
<tr><td>4</td><td>RDSO/T-8616</td><td>333</td><td>341.37</td></tr>
<tr><td>5</td><td>RDSO/T-8617</td><td>399</td><td>408.03</td></tr>
</table></td><td>NIL</td><td>NIL</td><td>Annexure X
(IRS Specification of T-56-~~2020~~-2024)

Minimum Weight of Metal Liners for use with Elastic Rail Clips
<table>
<tr><th>SN</th><th>Drawing No.</th><th>Minimum Weight of Metal Liner (gm)</th><th>Minimum Weight of Metal Galvanization(gm)</th></tr>
<tr><td>1</td><td>RDSO/T-3740</td><td>261</td><td>269.55</td></tr>
<tr><td>2</td><td>RDSO/T-3741</td><td>366</td><td>375.28</td></tr>
<tr><td>3</td><td>RDSO/T-3742</td><td>481</td><td>491.45</td></tr>
<tr><td>4</td><td>RDSO/T-8616</td><td>333</td><td>341.37</td></tr>
<tr><td>5</td><td>RDSO/T-8617</td><td>399</td><td>408.03</td></tr>
</table></td></tr>
</table>

SN	Exiting clause of IRS Specification Sl. No T-56 – 2020	Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)	Comments Received from Firms	RDSO's Remarks	Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)
	<table><tr><td></td><td>8750</td><td></td></tr><tr><td>9</td><td>RDSO/T-3738</td><td>277</td></tr></table>	<table><tr><td>6</td><td>RDSO/T-8748</td><td>294</td><td>302.05</td></tr><tr><td>7</td><td>RDSO/T-8749</td><td>362</td><td>370.23</td></tr><tr><td>8</td><td>RDSO/T-8750</td><td>479</td><td>488.42</td></tr><tr><td>9</td><td>RDSO/T-3738</td><td>277</td><td>285.40</td></tr></table>			<table><tr><td>6</td><td>RDSO/T-8748</td><td>294</td><td>302.05</td></tr><tr><td>7</td><td>RDSO/T-8749</td><td>362</td><td>370.23</td></tr><tr><td>8</td><td>RDSO/T-8750</td><td>479</td><td>488.42</td></tr><tr><td>9</td><td>RDSO/T-3738</td><td>277</td><td>285.40</td></tr></table>
43.	Annexure-XI (IRS Specification of T-56-2020) Proposed new Annexure-XI of IRS-T-56 TEST RESULTS- WEIGHT TEST 1.Name of the firm M/s: 2. Firms offer letter no.: 3. Liner to Drg. No.: 4. Qty on order: 5. Rly P.O no.: <table><tr><td>S,NO</td><td>Heat No.</td><td>Lot. No.</td><td>Quantity l(nos)</td><td>Sample size</td><td>Weight(gm)</td><td>No.of Directives</td><td>Cumulative No.of Defectives</td><td>Remarks</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	Annexure-XI (IRS Specification of T-56-2020) Proposed new Annexure-XI of IRS-T-56 TEST RESULTS- WEIGHT TEST 1.Name of the firm M/s: 2. Firms offer letter no.: 3. Liner to Drg. No.: 4. Qty on order: 5. Rly P.O no.: <table><tr><td>S,NO</td><td>Heat No.</td><td>Lot. No.</td><td>Quantity</td><td>Sample size</td><td>Weight(gm)</td><td>No.of</td><td>Cumulative No.of</td><td>Remarks</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	NIL	NIL	Annexure-XI (IRS Specification of T-56-2020) Proposed new Annexure-XI of IRS-T-56 TEST RESULTS- WEIGHT TEST 1.Name of the firm M/s: 2. Firms offer letter no.: 3. Liner to Drg. No.: 4. Qty on order: 5. Rly P.O no.: <table><tr><td>S,NO</td><td>Heat No.</td><td>Lot. No.</td><td>Quantity l(nos)</td><td>Sample size</td><td>Weight(gm)</td><td>No.of Directives</td><td>Cumulative No.of Defectives</td><td>Remarks</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>
44.	---------	**Annexure-XII** **(IRS specification of T-56-~~2020~~-2024)** **Technical Requirements for Hot Dip Galvanizing of low carbon steel Metal Liner to IS:2062** 1. **General requirements:**	NIL	New Annexure of Technical require	**Annexure-XII** **(IRS specification of T-56-~~2020~~-2024)** **Technical Requirements for Hot Dip Galvanizing of low carbon steel Metal Liner to IS:2062** 1. **General requirements:**

Reasoned document of Final draft of IRS Specification for Metal Liners For Use With Elastic Rail Clips Sl. No T-56– ~~2020~~ 2024(First Revision):

SN	Exiting clause of IRS Specification Sl. No T-56 – 2020	Proposed Final Draft of IRST-56-~~2020~~-2024 (First Revision)(uploaded on RDSO's website for 30 days)	Comments Received from Firms	RDSO's Remarks	Final Draft of IRS Specification,Sl. No T-56 – 2024 (First Revision)
	---------	1.1 The zinc used for galvanizing shall conform to any of the grades specified in IS-209 or IS-13229-91 1.2 The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc. 1.3 The minimum value of average mass of zinc coating on liner shall be 700 gm/m^2 **2. Surface preparation:** 2.1 The liner shall be subjected to cleaning in sodium hydroxide solution obtained by dissolving 10 to 15 Kg of sodium hydroxide in 100 liters of water. The temperature of alkaline bath will be kept between 80 to 90°C and immersion time of the article to be cleaned varying from 1 to 20 minutes depending upon the nature and degree of contamination. Immediately after cleaning in alkaline bath, the liner should be rinsed in hot water maintained at 60°C followed by rinse in cold running water. **2.2** After cleaning, the liner shall be subjected to pickling in hydrochloric acid. The dilute technical grade acid conforming to IS:265-1976 with an equal volume of water to be used for pickling. The actual concentration of the acid to be established for achieving the best results. A suitable inhibitor should be used with hydrochloric acid for pickling operation. After pickling, the liners should be rinsed in running water **3. Fluxing:** The rinsed liner to be dipped in a strong solution of Zinc ammonium chloride where the concentration of solution will be 200-400 gms of zinc ammonium chloride per liter. Some wetting agent to be added in the flux solution and a temperature of the solution may range from room temperature to 80°C. After fluxing, the liner to be thoroughly dried in air oven where the temperature of drying shall be maintained at about 120°C. **4. Galvanizing:** The liner after fluxing and drying should be galvanized without delay because flux coating picks up moisture from the air and also tends to oxidize. The liner should be galvanized at the lowest possible temperature of molten galvanizing bath, which will allow the free	NIL	ments for Hot Dip Galvanization of low carbon steel Metal Liner to IS:2062 has been added New Annexure of Technical requirements for Hot Dip Galvanization of low carbon steel Metal Liner to IS:2062 has been added	1.1 The zinc used for galvanizing shall conform to any of the grades specified in IS-209 or IS-13229-91 1.2 The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc. 1.3 The minimum value of average mass of zinc coating on liner shall be 700 gm/m^2 **2. Surface preparation:** 2.1 The liner shall be subjected to cleaning in sodium hydroxide solution obtained by dissolving 10 to 15 Kg of sodium hydroxide in 100 liters of water. The temperature of alkaline bath will be kept between 80 to 90°C and immersion time of the article to be cleaned varying from 1 to 20 minutes depending upon the nature and degree of contamination. Immediately after cleaning in alkaline bath, the liner should be rinsed in hot water maintained at 60°C followed by rinse in cold running water. **2.2** After cleaning, the liner shall be subjected to pickling in hydrochloric acid. The dilute technical grade acid conforming to IS:265-1976 with an equal volume of water to be used for pickling. The actual concentration of the acid to be established for achieving the best results. A suitable inhibitor should be used with hydrochloric acid for pickling operation. After pickling, the liners should be rinsed in running water **3. Fluxing:** The rinsed liner to be dipped in a strong solution of Zinc ammonium chloride where the concentration of solution will be 200-400 gms of zinc ammonium chloride per liter. Some wetting agent to be added in the flux solution and a temperature of the solution may range from room temperature to 80°C. After fluxing, the liner to be thoroughly dried in air oven where the temperature of drying shall be maintained at about 120°C. **4. Galvanizing:** The liner after fluxing and drying should be galvanized without delay because flux coating picks up moisture from the air and also tends to oxidize. The liner should be galvanized at the lowest possible temperature of

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5. Post Treatment:
The galvanized liner should be given post treatment in a chromating bath where the temperature of chromic acid solution is maintained around 70-75°C.
6. Stacking:
The liner after post treatment should be allowed to dry and thereafter should be stacked properly in a clean and well ventilated covered space.
7. Inspection and Testing:
The galvanized liner shall be subjected to inspection and testing in respect of freedom from visual defects, mass of galvanized coating,Uniformity of Coating, and adhesion as per clause 8&9 of IS 4759-1996.
7.1. Sampling:
7.1.1 Lot:
All the Liners of the same type in a coating bath having uniform coating characteristics shall be groupedtogether to constitute a lot.
7.1.2 Each lot shall be tested separately for the various requirements of the specification. The number of units to be selected from each lot for this purpose shall be as given below in Table 1
Table 1 - Scale of Sampling
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<tr><th>No of Units in the Lot (1)</th><th>No of units to be selected in a sample (2)</th><th>Acceptance No. (3)</th></tr>
<tr><td>Upto 25</td><td>3</td><td>0</td></tr>
<tr><td>26-100</td><td>5</td><td>0</td></tr>
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</table></td><td>NIL</td><td>New Annexure of Technical requirements for Hot Dip Galvanization of low carbon steel Metal Liner to IS:2062 has been added</td><td>molten galvanizing bath, which will allow the free drainage of zinc from liner. The bath temperature may vary from 440°C to 460°C. During galvanizing the temperature of molten metal should not exceed 475°C. The liner should be immersed as rapidly as possible in the molten bath ensuring safety. The time of immersion the molten bath to be established to achieve the best results and the liner should be withdrawn from the bath as soon as the boiling action is stopped. The liners after withdrawal from zinc bath should be subjected to the water quenching in tanks having overflowing water.
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	---------	501-1000 | 20 | 2 1001-10000 | 32 | 3 10000 & above | 50 | 5 **7.2 Freedom from Defects:** **7.2.1** The sample liners shall be checked for visually forFreedom from Defects. The zinc coating shall be uniform, adherent, reasonably smooth and free from such imperfections as flux, ash bare patches, black spots, pimples, lumpiness, runs, rust stains, bulky white deposits and blisters. **7.2.2** The sample selected shall be according to Table 1 of para 7.1.2. **7.2.3** Visual inspection of the material in a lot shall be made to determine the conformity with the requirements of 7.2.1.If the inspection warrants rejection of the lot, the galvanizer may segregate the good pieces of the lot and submit it once again for inspection. **7.2.4** If the lot inspected for visual inspection passes then it shall be declared as conforming to the requirements of 7.2.1. **7.3 Mass of Galvanized Coating:** **7.3.1** The sample selected shall be according to Table 1 of para 7.1.2. **7.3.2** The sample liners shall be checked for Mass of Galvanized Coating based on coating thickness by Magnetic method as per IS 3203:1982. Thickness of Galvanized Coating will be checked at locations given in Fig-1.The mass of coating in grams per square meter shall then be calculated by multiplying the average thickness in millimetres by a factor 7047.The minimum value of average mass of zinc coating on liner shall be700 gm/m2 .Thickness of Galvanized coating should not be less than 99µ at any of the locations for checking coating thickness as shownin figure-1otherwise it will be treated as a defect	NIL	New Annexure of Technical requirements for Hot Dip Galvanization of low carbon steel Metal Liner to IS:2062 has been added	151-500 | 13 | 1 501-1000 | 20 | 2 1001-10000 | 32 | 3 10000 & above | 50 | 5 **7.2 Freedom from Defects:** **7.2.1** The sample liners shall be checked for visually for Freedom from Defects. The zinc coating shall be uniform, adherent, reasonably smooth and free from such imperfections as flux, ash bare patches, black spots, pimples, lumpiness, runs, rust stains, bulky white deposits and blisters . **7.2.2** The sample selected shall be according to Table 1 of para 7.1.2. **7.2.3** Visual inspection of the material in a lot shall be made to determine the conformity with the requirements of 7.2.1.If the inspection warrants rejection of the lot, the galvanizer may segregate the good pieces of the lot and submit it once again for inspection. **7.2.4** If the lot inspected for visual inspection passes then it shall be declared as conforming to the requirements of 7.2.1. **7.3 Mass of Galvanized Coating:** **7.3.1** The sample selected shall be according to Table 1 of para 7.1.2. **7.3.2** The sample liners shall be checked for Mass of Galvanized Coating based on coating thickness by Magnetic method as per IS 3203:1982. Thickness of Galvanized Coating will be checked at locations given in Fig-1.The mass of coating in grams per square meter shall then be calculated by multiplying the average thickness in millimetres by a factor 7047.The minimum value of average mass of zinc coating on liner shall be700 gm/m2 .Thickness of Galvanized coating should not be less than 99µ at any of the locations for checking coating thickness as shownin figure-1otherwise it will be treated as a defect

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	---------	**7.3.3** If the number of defective units in a lot exceeds the acceptance number as per Table 1 of para 7.1.2, the lot shall be rejected else accepted.  Figure-1- Reference area for checking coating thickness on Galvanized Metal Liner **7.4 Determination of Uniformity of Galvanizing Coating** **7.4.1** The sample selected shall be according to Table 1 of para 7.1.2. **7.4.2** The sample liners shall be checked for uniformity of galvanizing coating by Preece Test as prescribed in IS 2633:1972. The sample liners should withstand 4 dip for aperiod of one minute. **7.4.3** If the number of defective units in a lot exceeds the acceptance number as per Table 1 of para 7.1.2, the lot shall be rejected else accepted. **7.5 Adhesion of Galvanized Coating** **7.5.1** The sample selected shall be according to Table 1 of para 7.1.2. **7.5.2** The sample liners shall be checked for Adhesion of Galvanized Coating. The coating shall withstand the pivoted hammer &knife tests as prescribed in IS 2629:1985. **7.5.3** If the number of defective units in a lot exceeds the acceptance number as per Table 1 of para 7.1.2, the lot shall be rejected else accepted. **Note:** i). **In pivoted hammer tests** Removal or lifting of the coating in the area between the impressions shall constitute failure. ii). **In knife tests**, it shall only be possible to remove small particles of the coating and it shall not be possible to peel any portion of the coating so as to expose the underlying iron or steel.	NiL	New Annexure of Technical requirements for Hot Dip Galvanization of low carbon steel Metal Liner to IS:2062 has been added	**.3.3** If the number of defective units in a lot exceeds the acceptance number as per Table 1 of para 7.1.2, the lot shall be rejected else accepted.  Figure-1- Reference area for checking coating thickness on Galvanized Metal Liner **7.4 Determination of Uniformity of Galvanizing Coating** **7.4.1** The sample selected shall be according to Table 1 of para 7.1.2. **7.4.2** The sample liners shall be checked for uniformity of galvanizing coating by Preece Test as prescribed in IS 2633:1972. The sample liners should withstand 4 dip for a period of one minute. **7.4.3** If the number of defective units in a lot exceeds the acceptance number as per Table 1 of para 7.1.2, the lot shall be rejected else accepted. **7.5 Adhesion of Galvanized Coating** 7.5.1 The sample selected shall be according to Table 1 of para 7.1.2. **7.5.2** The sample liners shall be checked for Adhesion of Galvanized Coating. The coating shall withstand the pivoted hammer &knife tests as prescribed in IS 2629:1985. **7.5.3** If the number of defective units in a lot exceeds the acceptance number as per Table 1 of para 7.1.2, the lot shall be rejected else accepted. **Note:** i). **In pivoted hammer tests** Removal or lifting of the coating in the area between the impressions shall constitute failure. ii**). In knife tests**, it shall only be possible to remove small particles of the coating and it shall not be possible to peel any portion of the coating so as to expose the underlying iron or steel.