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भारत सरकार – रेल मंत्रालय

Government of India- Ministry of Railways

केवल कार्यालय उपयोग के लिए
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SPECIFICATION OF POLYURETHANE SIDE BEARERS For Use in Freight Stock

Specification No. WD-38-MISC-2004 (Rev.-3)

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PREFACE

Specification No. WD-38-Misc-2004 (Latest) applies to Polyurethane Constant Contact Side Bearers (PU CCSB) used in the suspension systems of freight stock operating on Indian Railways.

This specification covers two variants of PU CCSBs, namely Design-A and Design-B, with details as follows:

S.No.	Design type	Application of CCSB in Freight Bogie
1.	Design-A	CASNUB 22HS
		CASNUB 22HS(Mod-I & II)
2.	Design-B	CASNUB 22NLB

CONTENTS

SPECIFICATION FOR POLY URETHANE SIDE BEARER PADS USED IN CASNUB BOGIES

1.0 SCOPE

1.1 This specification covers the technical requirements relating to material, design and tests for Polyurethane side bearer pads used in between bogie bolster and body bolster of CASNUB bogies of Indian Railways' freight stock. This specification does not include all the necessary provisions required for a supply contract.

1.2 It shall be the responsibility of the supplier to work out suitable design of the side bearer to meet the technical requirements indicated in this specification. Only constant contact side bearer shall be accepted.

1.3 During service, the Polyurethane side bearer pad is subjected to a compressive load of about 2.7 tons to 3.7 tons in static condition. In addition, the side bearer pad is also subjected to dynamic load of approximately 30.0 tons during operation of wagon in loaded condition, especially while negotiating curves in loaded condition.

1.4 The PU pads shall have excellent compressive and shear strength properties. It shall be capable of withstanding wide climatic variations prevailing in India without deterioration and without any marked change in characteristics.

1.5 This specification draws reference to some of the relevant IS specifications. Latest versions of these specifications shall be taken as reference unless mentioned otherwise.

1.6 While preparing this specification, due consideration has been given to the latest development in the field of Polymeric materials and process technologies, service requirements of Indian Railways and practices followed in other countries. This specification is subject to revision in view of fresh information or data being available with RDSO.

2.0 REFERENCE DOCUMENTS AND STANDARDS

2.1 This specification is intended to cover the technical provisions relating to material, construction and tests and does not include all the necessary provisions of the purchase contract.

2.2 This specification draws reference to specifications and standards given below. The firm shall have a copy of latest versions of these specifications:

Table 1: Reference to Specifications

S. No.	Specification No.	Description
1.	IS:3400 (Part-1)	Methods of Test for vulcanized Rubber -Tensile Stress-

S. No.	Specification No.	Description
		Strain Properties.
2.	IS:3400 (Part-2)	Methods of Test for vulcanized Rubber –Rubber, vulcanized or Thermo-Plastic (Hardness between 10 IRHD and 100 IRHD).
3.	IS:3400 (Part - 4)	Methods of Test for Vulcanized Rubber - Accelerated Ageing.
4.	IS:3400 (Part - 9)	Methods of Test for Vulcanized Rubbers-Specific Gravity
5.	IS:3400 (Part-10)	Methods of Test for Vulcanized Rubbers - Compression set at constant strain.
6.	IS:3400 (Part-22)	Methods of Test for Vulcanized Rub.-Chemical Analysis
7.	IS: 5517:1993 Gr.35Mn6Mo3	Steel for Hardening and Tempering-Specification
8.	BS970EN16	Manganese –Molybdenum Steel
9.	IS: 2062	Hot Rolled Medium and High Tensile Structural Steel.
10.	IS: 2	Rules for rounding off Numerical Values.
11.	IS: 13871	Powder Coating Specification

2.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2**.** The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

2.4 Firm shall conform to this specification, relevant drawings with latest alteration number, and latest relevant specifications. In case of conflict among the STR/Drawings/Other Specifications, the drawings shall take precedence over the STR and the Specification. The specification shall take precedence over the STR.

2.5 Firm shall generally follow the infrastructure, manufacturing, testing and quality control requirement mentioned in this specification. However, the firm can also offer alternate process infrastructure, manufacturing, testing facilities etc. Firm shall submit the detailed test report, documentary evidences, and the justification/ evidence to establish that the same can provide consistent output to desired level of output/ accuracy/ performance of the offered solution vis-à-vis specified in the specification to the Director General (Wagon)/RDSO, Lucknow for obtaining approval before use.

3.0 GENERAL CONDITIONS

3.1 Application for approval

The firm seeking approval for manufacturing and supply of Polyurethane side bearer

shall apply to RDSO, Lucknow as per the extent RDSO ISO procedure and other guidelines.

3.2 Credentials of the firm applying for approval

3.2.1 The firm must have written collaboration (MOU) of minimum five year for purchase of raw material and processing of cast poly Urethane material from a reputed primary manufacturer.

3.2.2 The firm should have qualified personnel acquainted with the design and manufacturing technology required for manufacturing of cast PU based resilient items as specified in this specification.

3.2.3 Firm shall have all machinery and infrastructure for manufacturing of Cast PUCCSB as per this specification.

3.2.4 Firm shall install all testing equipment's/machines for testing of PUCCSB as per this specification.

4.0 DEFINITION

4.1 Purchaser - means Zonal Railways/Workshop/PU or any other agency procuring the material, authorized by Indian Railways.

4.2 Engineers - Means Wagon Directorate, Research Designs and Standards Organization, Ministry of Railways, Lucknow (India) – 226 011.

4.3 Inspecting Officer – Means the person, firm or department nominated by the purchaser to inspect the work on his behalf and the deputies of the Inspecting Officer so nominated.

5.0 MATERIAL

5.1 The material used in the manufacturing of side bearer pads shall be ‚Cast Polyurethane' manufactured by any reputed and established primary manufacturer of Cast Polyurethane. Documentary evidence in this respect will be required to be submitted to RDSO as a preliminary requirement for vendor registration. Details of the primary manufacturer of Cast Polyurethane shall be part of approved QAP and any change shall be done only with prior approval from DG (Wagon), RDSO.

5.2 Use of regenerated/re-constituted material is not permitted.

5.3 Other proven Non-Metallic Spring Element (other than cast polyurethane) can be considered with prior approval of DG (Wagon), RDSO.

5.4 As the PUCCSB is a proprietary item wherein the design, materials, manufacturing process, etc. lies with the firm, meeting performance requirement given in the

specification. Therefore, the offered material for housing and spring element shall meet all the functional and performance parameters as per this specification for which firm shall also submit a declaration to RDSO.

6.0 DESIGN AND FUNCTIONAL REQUIREMENTS

6.1 The PU side bearer pads shall fit within the dimensional envelope specified in RDSO Drawing No. WX-04057 (Annexure-I) and shall comply with all other stipulations mentioned therein. The latest Envelop Drawing No. WX-04057 shall be referred to for the manufacturing of the PU Constant Contact Side Bearer (PUCCSB).

6.2 Two PU side bearers design as per following details shall be used for specified bogies type. CPSB drawing of the relevant wagon shall be referred for deciding the type of PUCCSB to be used.

Table 2

Design type	Bogies
A	Casnub 22 HS, Casnub 22HS(Mod-I & II)
B	Casnub 22NLB

6.3 Design details of A type & B type:-

Table 3

Components	Design A	Design B	Remarks
Housing	Same for both type		Interchangeable
PU Rings	3 Nos.	2 Nos.	Interchangeable
Packing	NIL	1 Nos.	To adjust the height

7.0 MANUFACTURING PROCESS AND FINISH

7.1 The Polyurethane components of side bearer pads shall be manufactured by continuous Poly Urethane casting process.

7.2 The Polyurethane components of side bearer shall be smooth, free from air bubbles, surface streaks, splash marks, pinholes, voids, blistering etc. All the edges shall be neatly finished and free from flash.

8.0 TECHNICAL REQUIREMENTS OF POLYURETHANE SIDE BEARER

The values of paragraphs 8.1, 8.2 and 8.3 shall be submitted by the manufacturer to RDSO, Lucknow for vendor registration.

8.1 Physical Properties of housing

(i) Physical properties for top and bottom housing of CCSB shall be as per following table.

Table: 4

Properties	**Forging**
	IS:5517:1993 Gr 35Mn6Mo3 / BS970EN16
Tensile strength (min.)	1050MPa
Yield strength (min.)	700 MPa
Elongation (min.)	14%
Charpy V notch(min.)	55J
Hardness	302-375 BHN

Note:

1. In case the firm is offering any alternate material, the firm shall specify the values for all the physical property parameters as mentioned above. The firm shall also specify chemical composition and micro-properties of the offered material. Use of such alternate material will require prior approval from DG (Wagon), RDSO.

2. Besides forging, firm can also offer any alternate manufacturing process with prior approval from DG (Wagon), RDSO. However, offered alternate manufacturing process must be a proven process for such application and mechanical properties of the offered material shall be equivalent or better than mentioned in table above. The firm shall also specify chemical composition and micro-properties of the offered material.

(ii) The chemical composition, micro examination, and physical testing of the housings must be conducted in-house by the firm in accordance with the approved QAP/drawing, and records must be presented to the inspecting official. The inspecting official will countercheck one sample per lot for chemical composition, micrographic examination, and physical properties according to the approved QAP/drawings to ensure that the material properties comply with the approved QAP.

(iii) In case, firm is outsourcing the housing elements, the firm shall bear full responsibility for the quality control, physical and functional properties, warranty requirements, and all other aspects specified in this specification. The source of material and specification shall be submitted by the firm in the Drawings/QAP at the time of registration and any change will require prior approval from DG (Wagon), RDSO.

8.2 **Physical Properties of PU**

The physical properties of material of Cast Polyurethane side bearer shall be checked from the finished product wherever practicable and the remaining checks shall be carried out from the test specimen prepared under the identical conditions of moulding of Cast Polyurethane side bearer using the same raw material. Sample preparation from finished product and/or test specimen shall be part of QAP. The checks shall be conducted as per methods given in IS Standards mentioned below and their values shall conform to the following limits:

i) **Physical properties before ageing:**

Table: 5

S.No.	Property	Test Method	Units	Permissible Limit
1	Specific Gravity	IS: 3400 Part IX	-	To be specified by the vendor at the time of vendor registration and accepted values shall be part of QAP.
2	Tensile Strength	IS: 3400 Part I	Kg/cm^2	
3	Elongation at Break	IS: 3400 Part I	%	
4	Hardness	IS: 3400 Part II	Shore A	
5	Compression Set at $70^0 \pm 1^0$ C for 24 (+0/-2) hours	IS: 3400 Part X	%	
6	Ash content	IS: 3400 Part 22	%	

ii) Accelerated ageing at 70 ± 1 °C for 24 (+0/-2) hours [As per IS: 3400 Part IV]

Table: 6

S. No.	Property	Permissible Limits	Test Method	Units	Permissible Limits
1	Change in tensile strength (%)	Shall be within ± 25%.	To be specified by the vendor at the time of vendor registration and accepted values shall be part of QAP.		
2	Change in Elongation at break	Shall be within ± 25%.			
3	Change in Hardness (Shore A)	±2 (two) degrees			

For the purpose of confirming/co-relating the degree of curing and composition of the test specimens with that of the finished product, inspecting authorities may at their discretion shall perform the following tests both on the test specimens and the products, and shall comply with the requirements as under:

a) For comparing the degree of curing: -

Hardness (Shore A): The result shall be within ± 2 (two) degrees

b) For comparing the composition:

(i) Identification of Polymer: Test observations/values shall be identical

(ii) Specific Gravity: The result shall be within ± 0.02

(iii) Percent Ash Content: The result shall be within ± 1.0 for ash content up to 20% and ± 1.5 for ash content above 20%.

8.3 **Resistance to Hydrolysis**

After Hydrolysis on boiling in distilled water at atmospheric pressure for 72 (+0/- 2) hours, the tensile strength, elongation at break and hardness shall not vary from the value obtained before boiling by more than the following limits:

Table: 7

S.No.	**Property**	Permissible Limits	**Permissible Limit**
1	Tensile Strength	± 25%.	To be specified by the vendor at the time of vendor registration and accepted values shall be part of QAP.
2	Elongation at break	+50/-0	
3	Hardness (Shore A)	+0/-7	

8.4 **Compressive Load-Deflection Test**

This test shall be carried out at room temperature (generally 27 +/- 2 °C) and on suitable Load Deflection Machine at the speed of 10±5 mm/minute. The Polyurethane side bearer pad shall be subjected to three successive loadings as given below as per design of side bearer. During the fourth cycle, the side bearer shall be compressed with a load of 50kg and deflection shall be taken 'Zero' at this point. Then the deflection shall be recorded with help of dial gauge(s)/digital display. The load and deflection value shall be in the range as per table given below: -

Table: 8

Type of PU Side Bearer	**Load (t)**	**Deflection (mm)**
Design A	2.70	18.5 – 20.5
Design B	2.25	10.0-12.0

Note: In addition to the above, the vertical compressive load-deflection characteristics of each PUCCSB design being offered shall also be recorded graphically for all loads, ranging from 0 tons to the maximum load at which the side bearer becomes solid. Measurements shall be taken at intervals of 0.5 tons for loads up to 3 tons, at intervals of 1 ton for loads up to 6 tons, at intervals of 3 tons for loads up to 15 tons, and thereafter at intervals of 5 tons. It shall be part of QAP also.

8.4.1 **Strength test**

The defection shall be recorded upto a vertical compressive load of 45 tons, three times at interval of one minute. The CCSB should not home (solid condition) at this load. There should not be any damage to any component.

8.4.2 **Fatigue Test in Vertical Mode**

The Polyurethane side bearer shall be subjected to fatigue test in vertical directions continuously as mentioned in the table to determine the fatigue life at the time of vendor registration and subsequently at every purchase inspection as specified in this specification. This shall also be conducted during process and quality audit.

The load to be applied for this purpose on the PU side bearer pad shall be varying as per table given below: -

Table: 9

Sinusoidal Load	Nos. of cycle	Frequency
0 to 4.0t	10,00,000	2 Hz
0 to 4.5 t	6000	1.5 Hz
0 to 5.0 t	2000	1 Hz
0 to 6.0t	1000	0.5 Hz

Necessary testing facilities shall be installed by the firm in its premises. Fatigue testing machine should satisfy following parameters:

i) It should be possible to read load applied as well as number of cycles directly in the machine.

ii) The loading cycle shall be sinusoidal for all loads as specified in the table given above in their respective frequencies in the graphical mode.

iii) The dynamic load may get relaxed as the vertical fatigue test progresses. The maximum load should not be allowed to relax below 93.75% and should be readjusted to original value.

The permanent set observed (after completion of fatigue testing) in Poly Urethane side bearer pad shall not be more than 4.0 (four) mm and to be checked after 10 minutes of testing (not later than 20 minutes). Lower value of permanent set will be preferable.

The Cast Polyurethane components of constant contact side bearer shall not show any sign of cracking/perishing during and after completion of fatigue test. Metallic components of constant contact side bearer shall not show any sign of deformation crack or damage.

9.0 INSPECTION- LOT SIZE, SAMPLING AND CONFIRMATORY TESTS

Regular inspection of the side bearer shall be carried out by the Inspecting agency at the vendor's premises. The vendor shall provide, without extra charges, for material, equipment, tools and any other assistance, which the Inspecting agency may consider necessary for tests and examination. The vendor shall make available manufacturing drawings and material specifications of the components to the inspecting agency at the time of inspection.

9.1 The lot size of side bearer pads to be offered in one inspection shall be maximum 1000 nos. or part thereof. The vendor shall offer the lot for inspection after complete checking by them. The internal test results shall be submitted to the inspecting agency:-

Table: 10

S.No	Description	Quantity offered
i.	Dimensional checks	20 Assemblies.
ii.	Visual inspection	20 Assemblies
iii.	Compressive load deflection test	20 Assemblies
iv.	Physical properties of PU before & after ageing	2 Assemblies
v.	Resistance to hydrolysis	2 Assemblies
vi.	Load heavy strength test for CCSB	5 Assemblies (Para 8.4.1)
vii.	Fatigue test	Every 10,000 nos (Ten thousand) of CCSB supplied or one year period from previous supply, whichever is earlier.

Note: The same Assemblies will be subjected to compressive load deflection test and fatigue test.

9.1.1 After testing, samples should be preserved for one year from the date of testing completion done at the firm's premises. The firm ensures that test samples are made available as per requirement.

9.1.2 If any of the sample fails in any criteria mentioned above, then double samples will be taken from the same lot and shall be tested for the same criteria and if any sample fails out of these, the entire lot of 1000 or part thereof will be mandatory rejected and destroyed. Inspection shall not be commenced till further advice from RDSO. The firm shall investigate and come up with satisfactory reasons for the failure, take remedial action to improve the quality of material and improved process control and also implement the same.

9.2 Material shall be offered for inspection within two months of manufacturing of PU

components.

9.3 Material offered for inspection shall not be withdrawn during the course of inspection. Any move to withdraw the material or interfere with the inspection in any way shall render the entire lot being rejected.

9.4 In the event of rejection, the entire lot offered for inspection shall be made unusable in the presence of the inspecting/purchasing authority. Method for making rejected material unusable shall be part of QAP.

9.5 Any failure in attribute checked on 100% of pads internally as per the firm's own quality assurance plan will be considered the failure of the firm's own quality assurance plan. In that case manufacturer will have to review their internal quality assurance programmed and take corrective action accordingly duly advising details of action taken to RDSO.

The Polyurethane side bearer pad, which has been inspected and passed, shall be double stamped by the Inspecting Agency. The entire quantity of Polyurethane side bearer pads from which the sampling has been taken shall be stamped (single stamp mark) by the Inspecting Agency. Double stamping mark is to identify the samples, which were drawn for inspection for future reference in the event of any dispute.

9.6 The responsibility of lot offered for inspection shall be of manufacturer and the manufacturer shall submit a certificate that the entire lot offered for inspection was internally checked and it conforms to the technical requirements of RDSO approved drawings and this specification.

9.7 Apart from the above, detailed process/stage inspection shall be carried out of the different process/stages detailed in this specification and as per the approved QAP by the concerned official of QA unit or as nominated by DG(Wagon)/RDSO once every twelve (12) months or as approved by DG(Wagon)/RDSO.

10.0 QUALITY AUDIT

The quality audit of the firm shall be carried out to ensure the adherence to its quality assurance plan and its general quality consciousness as per extant RDSO ISO procedures. This quality audit may also be carried out on the need basis in case of reports of severe premature failures of the product are received from Railways. For establishing this, the samples shall be collected from Railways and sent to RDSO, Lucknow as and when required for carrying out the tests mentioned in this Specification.

11.0 QUALITY ASSURANCE PLAN (QAP)

11.1 The manufacturer shall prepare a Quality Assurance Plan (QAP) as per the relevant ISO Document No. i.e. QO-F-8.1-7 (latest) and submit it for approval to the DG (Wagon)/RDSO, Lucknow and shall obtain his approval before commencing the manufacture of the Polyurethane CCSB. Besides other aspects, the following salient points shall be taken into consideration for the preparation of QAP to be submitted to the Approving Authority.

11.2 There should be at least one full time polymer technologist having a minimum bachelor's degree in relevant field with 5 years' experience or a diploma in relevant field with 08 years' experience. The person should be free from day to day production, testing & quality control responsibility. The person should be mainly responsible for development of a product, analysis of products, control over raw material, corrective action in case of difficulties in achieving the parameters.

11.3 Ensure that the in-charge of the Quality Control Section is having a qualification of minimum bachelor's degree in the relevant field and have minimum 5 yrs. experience or a diploma holder with minimum 08 years' experience. The person should be actively involved in day to day activities of quality control/stage inspection/compliance of QAP etc.

11.4 There should be a system to ensure use of correct raw material and traceability of the product from raw material stage to finished product stage. This system should also facilitate to identity the raw material composition from the finished product stage.

11.5 Ensure that there is a system to identify defective components at various stages of manufacture, the reasons for occurrence of defects and also a system for disposal of those defective rejected components.

11.6 Ensure that proper analysis is being done on monthly basis to study the rejection/defect at various in internal stages, and to take corrective action thereafter.

11.7 Ensure that a proper documentation of all the above steps is there, which is to be presented on demand by the engineer.

11.8 Ensure the proper record of complaints received from customers of Railway and corrective action take thereof, is maintained.

11.9 Following parameters are to be included in QAP, Section- (E)

11.9.1 Details of Incoming Raw Materials: Details that includes Grade of the material, Supplier Certificate including test parameters, Parameters for Inspection, Mode of Inspection, Equipment used for testing, Acceptable Limit, National/International Standards if any, frequency of testing/Inspection of following raw material shall be incorporated.

Side Bearer Housing

(i) PU Rings
(ii) TPU sleeve
(iii) Spacer Plate
(iv) The list shall include all the raw material used for preparation of PU/TPU compound.

11.9.2 Details of In-process Inspection and Product Inspection: Details that includes Machine Process Parameters to be controlled and checked, Quality Check Points, Characteristics of Product Parameters, Characteristics of Process Parameters, Mode of Inspection, Equipment used for testing, Acceptable Limit, National/International Standards if any, frequency of testing/inspection, of following major process shall be incorporated.

(i) Storage of raw material and semi-finished and finished product
(ii) PU Casting
(iii) Marking
(iv) Painting
(v) Product Inspection
(vi) Packing, Storage and dispatch.

12.0 RECORD KEEPING

12.1 The manufacturer shall keep all the relevant records of Internal Quality Programme for future reference /investigations. The manufacturer shall present their records as and when asked by Purchaser / Inspecting Official or Engineer.

12.2 Manufacturer shall maintain the records of number of pads supplied to the consignee, failure detail, warranty disposal and corrective action taken thereon. This shall be checked during the process audit. Retention period of these records shall be more than the warranty period of PUCCSB.

13.0 PROCEDURE OF VENDOR APPROVAL

13.1 The firm required to apply to RDSO for registration as per procedure prevailing at that point of time. The firm is required to apply for registration with appropriate documents along with registration fees.

13.2 RDSO document 'Vendor application processing' ISO Document No. QO-D-8.1-6 (latest) shall be followed for the registration and approval of the firm. For document scrutiny the firm shall refer the ISO Document No. QO-F-8.1-1 (latest) and No. QO-F-8.1-7 (latest). For Capability assessment the firm shall refer the ISO Document No. ISO QO-F-8.1-8 (latest), this specification and QAP. The firm shall also submit the detailed design and drawings of the offered PUCCSBs, conforming to the requirements of this

specification, to Director General (Wagon)/RDSO for approval.

13.3 Based on successful completion of above, the firm shall be required to submit in house test results (ITR) of their product to Director General (Wagon)/RDSO which shall include all required tests mentioned this specification. After that prototype testing shall be undertaken. Decision conveyed to the manufacturer regarding permission to manufacture 20 nos. of prototype PUCCSB each design to this specification along with provisionally approved QAP.

13.4 On receipt of permission for prototypes, the manufacturer shall then give 15 days' notice to DG (Wagon)/RDSO, Lucknow for witnessing of critical manufacturing activities/process as per provisionally approved QAP. Besides witness by RDSO complete process shall be video graphed arranged by firm and submitted to RDSO in a hard drive duly labeled.

13.5 After successful completion of above, confirmatory testing as mentioned in Para-8 of this specification shall be carried out at RDSO or any other lab approved by DG(Wagon)/RDSO, Lucknow for which firms shall submit samples to Director General (Wagon)/RDSO and necessary charges shall be paid by firm in advance as per the extant guidelines. The sample shall consist of eighteen dumbbells for Tensile Strength properties and Hardness Test (as per IS:3400 part-1) , three buttons for Compression Set (as per IS:3400 part-10), two samples for Specific Gravity , two samples for Ash content and Samples for Chemical, Micro and Physical Property Test of Housing as per the specification. Five numbers (5 Nos.) PUCCSB for each design are also to be submitted which shall be drawn by the concerned RDSO field Unit or any official as nominated by DG (Wagon)/RDSO from a minimum lot of 20 numbers for each design.

Following tests shall be done

a) Dimensional check on 5 pads
b) Visual inspection on 5 pads.
c) Compressive load deflection test on 05 pads (as per Para no.8.4)
d) Physical properties before & after ageing on 2 pads (as per Para no 8.2)
e) Resistance to hydrolysis on 2 pads (as per Para no 8.3)
f) Load heavy strength test for CCSB on 03 pads (as per Para no 8.4.1)
   Note: The same pads will be subjected to compressive load deflection test & fatigue test.
g) Fatigue test- 1(one) sample for each.
h) Metal plates (one set) for Mechanical Properties & Chemical Composition.

13.6 The test results of para-13.5 shall be put up to Director General (Wagon)/RDSO, Lucknow for approval.

13.7 Based on successful completion of above test, the Firm shall submit a copy of the

purchase order (issued by purchaser/s) to RDSO. The PUCCSB of any design (Design A or Design B) 750 Nos. (Seven hundred fifty) of PUCCSB manufactured by the firm duly inspected by the concerned QA Mechanical Unit of RDSO or any official nominated by DG (Wagon), RDSO shall be monitored for field performance on three CC rakes by RDSO, Lucknow. The wagon depot(s) where these PUCCSB shall be supplied for fitment shall be informed to RDSO (Wagon Dte.) by the vendor, in order to monitor their field performance for a period of 12 (Twelve) months/one year from the date of fitment.

Failure criteria shall be as follows:-

(i) During field performance monitoring, Railways shall maintain and provide Quarterly performance details of PUCCSB to Wagon Directorate. The performance details shall include Quarterly fitment details (Month & Year of Manufacturing, Month & Year of Fitment and Fitment Quantity), Quarterly failure details (Month & Year of Manufacturing, Month & Year of Failure and Failure Quantity). The data for field trial of side bearer is to be recorded as provided in **Annexure-II.**

(ii) During field performance monitoring, failure of PUCCSB shall not be more than 2 % of PUCCSB pads fitted during the trial period.

(iii) If the PUCCSB pad failure is more than 2% of total PUCCSB pad under field performance monitoring period (Twelve months), the field trials may be extended for another Six months. However, the failure upto the extended period should not be more than 2.5 %. The Firm shall not be allowed to supply any further material in the extended trial period.

(iv) During field performance monitoring, detailed field performance of PUCCSB shall also be monitored.

(v) For this, 40 PUCCSB shall be fitted in nominated wagons in presence of Wagon Directorate Officials. Firm shall provide a unique serial number to each of these 40 PUCCSB. Free height and setup height of each of these PUCCSB shall be jointly recorded by the Zonal Railway, firm and RDSO. After completion of twelve months, 20 PUCCSB shall be randomly picked from the field for detailed examination. These PUCCSB shall be checked for cracking, perishing and damage, if observed, during the field trials shall be recorded. The pad shall be considered as ‚failed` if any one of the following limits is observed:

(a) Housing crack, breakage and deformation.
(b) Wear in head of top housing more than 2 mm.
(c) Gap in Top & Bottom Housing.
(d) Permanent set above 4mm.

(e) Crack, plastic deformation or crushing in PU rings and TPU sleeve.
(f) Deformation in spacer plate.
(g) Any other defects.

Apart from above, the PUCCSB shall also be checked as per the detailed Annexure-II.

Total failure of PUCCSB shall not be more than 2% PUCCSB. This shall also be added to work out % at para (iii) above.

13.8 Supply beyond the field trial quantity including sub-components shall commence only after successful completion of the field trial. No individual items/sub-assemblies/ child parts such as housings, sleeves, spacers, PU rings, Kits without housings etc. are allowed to be supplied until successful completion of field trials.

13.9 After successful field trial, firm shall be registered as 'RDSO Vendor for Developmental Orders'. Final approval shall be accorded as per existing procedure prevailing at that time.

13.10 All the provisions contained in RDSO's ISO procedures laid down in document No. QO-D-8.1-11 latest (Title: ‚Vendor-Changes in approved status') and subsequent versions/amendments thereof, shall be binding and applicable on the registered vendor/vendors for manufacture and supply against the tenders floated by Railways to maintain quality of products supplied to Railways.

13.11 All terms and conditions for vendor registration/approval of foreign firms shall be applicable as stipulated in RDSO ISO document QO-D-8.1-5 (latest version) title, Application for registration of vendor'. In case of any contradiction between the clauses of this specification and ISO document QO-D-8.1-5 regarding the vendor registration/approval of foreign firms, the clauses of ISO document shall prevail.

14.0 MARKING

14.1 All metallic parts of PU side bearer i.e. top and bottom housing and spacers etc. shall be engraved/ embossed on non-wearing surface in clearly legible with minimum 6 mm letter size & 0.3 mm depth having following details:-

(i) Manufacturer's name /initial/trade mark

(ii) Month and the year of manufacture

14.2 All PU components shall be marked for above particulars by engraving/laser engraving /embossing in minimum 3mm size in letter on non-wearing surface. Marking by inkjet printing/ink-stamping is strictly prohibited.

14.3 Firm shall ensure that the marking is legible and remain till the life of the component.

14.4 Any PUCCSB found having illegible markings at the time of fitment in Railway Workshops, Maintenance Depot or at Wagon Builder premises shall be treated as rejected and shall be replace by the manufacturers free of cost. The cost of transportation shall also be borne by manufacturer.

14.5 Marking scheme shall be part of QAP and any changes will require prior approval from DG (Wagon), RDSO.

15.0 PACKING

15.1 The each PU side bearer pads assembly shall be suitably packed so as to protect against damage during transit and storage. In the event of sublet orders placed by bogie manufacturers, packing shall be as agreed to in between the purchaser and the supplier.

15.2 Packing scheme shall be part of QAP and any changes will require prior approval from DG (Wagon), RDSO.

16.0 PERFORMANCE WARRANTY

The performance of the Polyurethane side bearer shall be for a period of **30 (thirty) months** from the month and year of manufacturing. Premature failure of the Polyurethane side bearer shall be reported by wagon depot/sick line to the vendor through online portal (FMM, IREPS and RDSO portal). The vendor shall make warranty replacement to the wagon depot/sick line, which has reported the failure as per extant guidelines.

17.0 STORAGE

The PU side bearer pads shall be stored under cover and dry place, avoiding sunlight, oily substances, acidic/ alkaline or any other corrosive substances. Storage plan shall be part of QAP and any changes will require prior approval from DG (Wagon), RDSO.

18.0 PROTECTION AGAINST CORROSION

18.1 **Final Painting** :

Powder coating as per IS: 13871 shall be done on the housings for protection from corrosions. Minimum thickness on exterior surface shall be 50 microns. Powder coating film thickness shall be checked by Elcometer.

18.2 The powder coating procedure shall be part of QAP. Firm can also use any alternate method with similar or superior results with prior approval from DG (Wagon), RDSO.

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Annexure I

TECHNICAL DETAILS OF CONSTANT CONTACT SIDE BEARER

(i) Free height of constant contact side bearer.

(ii) Height of constant contact side bearer in Preload condition for BOXNHS/BCNAHS and BOXNNLB/BCNANLB etc.

(iii) Height in Solid condition.

(iv) Maximum preload for which the constant contact side bearer is designed.

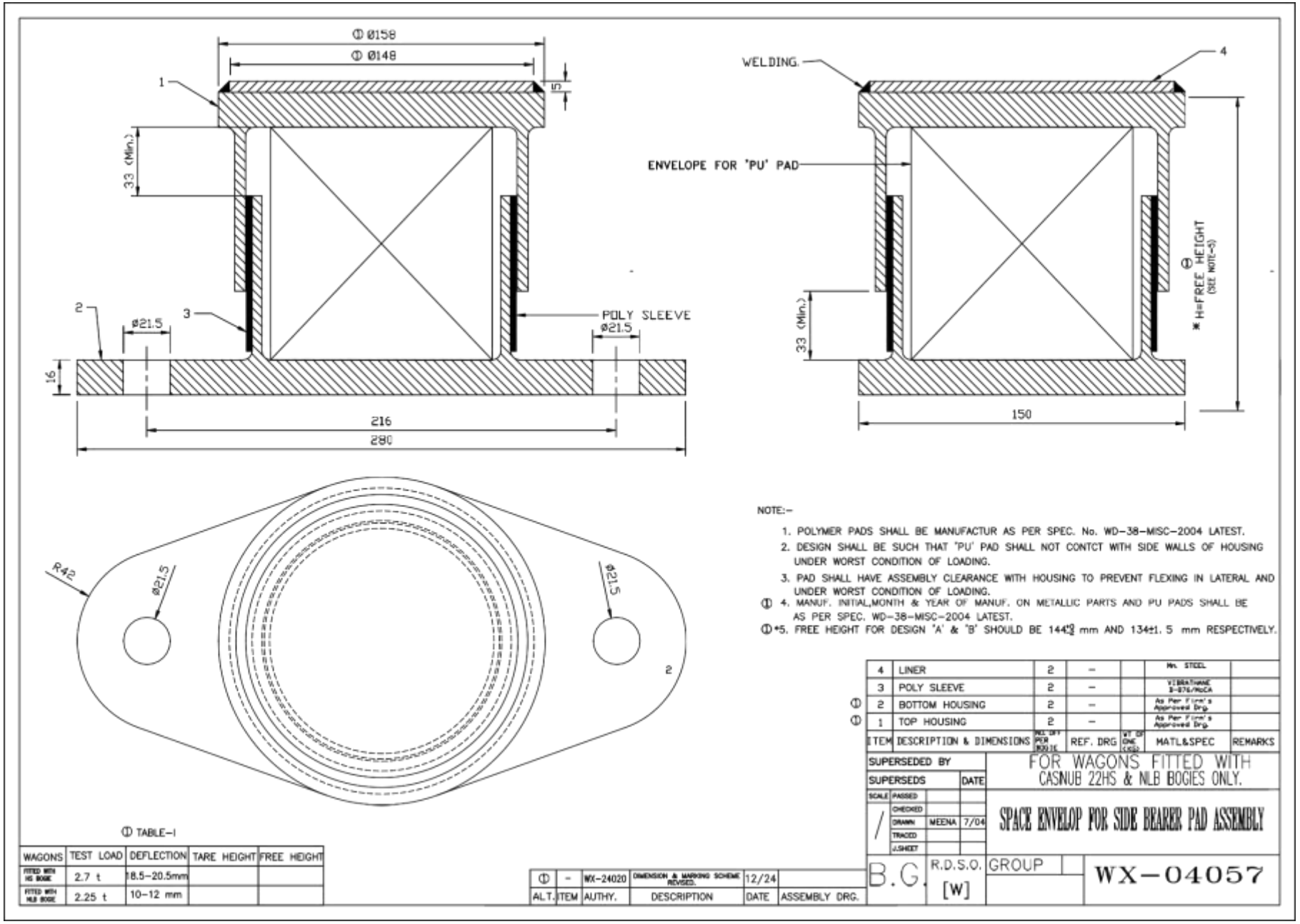
(v) Material of housing and other metallic components.

(vi) Material of spring element and other non-metallic components.

(vii) Weight of complete unit.

(viii) Vertical Load-deflection characteristics of the design (of constant contact side bearer) being offered, starting from 0 (zero) tones to maximum load (at which the side bearer becomes solid) at an interval of 0.5 tones compressive load.

Note: Items i, ii, iii, iv, v, vi, vii and viii above are to be mentioned on the drawing of constant contact side bearer.



NOTE:-

1. POLYMER PADS SHALL BE MANUFACTUR AS PER SPEC. No. WD-38-MISC-2004 LATEST.
2. DESIGN SHALL BE SUCH THAT 'PU' PAD SHALL NOT CONTCT WITH SIDE WALLS OF HOUSING UNDER WORST CONDITION OF LOADING.
3. PAD SHALL HAVE ASSEMBLY CLEARANCE WITH HOUSING TO PREVENT FLEXING IN LATERAL AND UNDER WORST CONDITION OF LOADING.
① 4. MANUF. INITIAL,MONTH & YEAR OF MANUF. ON METALLIC PARTS AND PU PADS SHALL BE AS PER SPEC. WD-38-MISC-2004 LATEST.
①*5. FREE HEIGHT FOR DESIGN 'A' & 'B' SHOULD BE 144±2 mm AND 134±1.5 mm RESPECTIVELY.

	ITEM	DESCRIPTION & DIMENSIONS	NO. OFF PER BOGIE	REF. DRG	WT OF ONE (KGS)	MATL&SPEC	REMARKS
	4	LINER	2	–		Mn. STEEL	
	3	POLY SLEEVE	2	–		VIBRATHANE B-876/MoCA	
①	2	BOTTOM HOUSING	2	–		As Per Firm's Approved Drg.	
①	1	TOP HOUSING	2	–		As Per Firm's Approved Drg.	

① TABLE-I

WAGONS	TEST LOAD	DEFLECTION	TARE HEIGHT	FREE HEIGHT
FITTED WITH HS BOGIE	2.7 t	18.5–20.5mm		
FITTED WITH NLB BOGIE	2.25 t	10–12 mm		

①	–	WX-24020	DIMENSION & MARKING SCHEME REVISED.	12/24	
ALT.	ITEM	AUTHY.	DESCRIPTION	DATE	ASSEMBLY DRG.

SUPERSEDED BY

SUPERSEDS DATE

SCALE / PASSED / CHECKED / DRAWN MEENA 7/04 / TRACED / J.SHEET

FOR WAGONS FITTED WITH CASNUB 22HS & NLB BOGIES ONLY.

SPACE ENVELOP FOR SIDE BEARER PAD ASSEMBLY

B.G. R.D.S.O. [W] GROUP

WX-04057

Annexure-II (Page 1 of 3)

Proforma for Service Trial of Constant Contact Side Bearers used in Wagon

Section A: Initial Measurement

Drawing No. **Type of Side Bearer:**
CC Rake No.: **Type of Bogie.:**
Date of Fitment:
Place of Fitment:

Sl. No.	Wagon No.	Bogie No. 1							Bogie No. 2						
		CCSB Free Height		CCSB Set up Height		CP assembly Height	Marking Details	Specific Serial Number	CCSB Free Height		CCSB Set up Height		CP assembly Height	Marking Details	Specific Serial Number
		Right	Left	Right	Left				Right	Left	Right	Left			

Signature of RDSO JE/SSE with date **Signature of Zonal Railway JE/SSE with date** **Firm representative Sign.**

Annexure-II (Page 2 of 3)

Proforma for Service Trial of Constant Contact Side Bearers used in Wagon

Section B: In service Quarterly Measurement

Drawing No: **Type of Side Bearer:**

CC Rake No.: **Type of Bogie:**

Date of Measurement:

Sl. No.	Wagon No.	Bogie No. 1							Bogie No. 2						
		CCSB Set up Height		Failure, if any		CP assembly Height	Marking Details/ Specific Serial Number	Remarks	CCSB Set up Height		Failure, if any		CP assembly Height	Marking Details/ Specific Serial Number	Remarks
		Right	Left	Right	Left				Right	Left	Right	Left			

Signature of RDSO JE/SSE with date **Signature of Zonal Railway JE/SSE with date** **Firm representative Sign.**

Annexure-II (Page 3 of 3)

Proforma for Service Trial of Constant Contact Side Bearers used in Wagon

Section C: Final Measurement at the end of trial

Drawing No: **Type of Side Bearer:**
CC Rake No.: **Type of Bogie:**
Date of Measurement:

Sl. No.	Wagon No.	Bogie No. 1							Bogie No. 2						
		CCSB Free Height		CCSB Set up Height		CP assembly Height	Failure, if any/Remarks		CCSB Free Height		CCSB Set up Height		CP assembly Height	Failure, if any/Remarks	
		Right	Left	Right	Left		Right	Left	Right	Left	Right	Left		Right	Left

Signature of RDSO JE/SSE with date **Signature of Zonal Railway JE/SSE with date** **Firm representative Sign.**