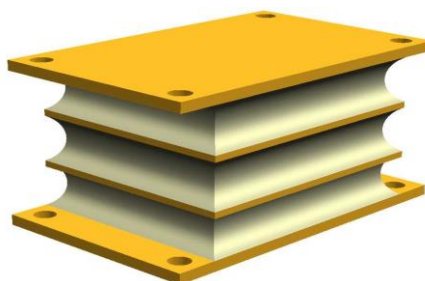




भारत सरकार रेल मन्त्रालय
GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

TECHNICAL SPECIFICATION OF CONVENTIONAL
SIDE BEARER (RUBBER SPRING)
FOR LOCOMOTIVE BOGIES



Specification No. VL-03
(Rev. 03)

October, 2020

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Cost (Rs).....

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TECHNICAL SPECIFICATION OF CONVENTIONAL SIDE BEARER (RUBBER SPRING) FOR LOCOMOTIVE BOGIES

1.0 SCOPE

- 1.1 This Specification covers the technical requirements relating to material, manufacture and tests for Side Bearer (Rubber Spring) used in locomotive bogies. This does not include all the necessary provisions required for a supply contract.
- 1.2 This specification specifies the operating & performance requirements and the methods of testing of Side Bearers. This side bearer, as shown in RDSO drawing no. SK.VL-127 (Rev-11 or Latest) is presently used in the secondary stage of suspension of WAG7 locomotives.
- 1.3 The side bearers are subjected to static and dynamic loadings both in compressive and shear modes simultaneously under actual operating conditions. The maximum loading on the side bearer including dynamic loading is 16 tonnes in compressive mode and 2.5 tonnes in shear mode.
- 1.4 The side bearer shall be capable of withstanding wide climatic variations prevailing in the country without physical deterioration and change in the compression and shear stiffness characteristics shall be within the specified range for natural rubber.

2.0 DEFINITION

- 2.1 Wherever “Inspecting Agency” has been mentioned in this document, it shall be taken as “Authorized Inspecting Agency” as mentioned in the Purchase Order.

3.0 INSTRUCTIONS FOR THE PURCHASER

- 3.1 The manufacturer shall be an RDSO Approved Vendor and the manufacture’s name shall be on the current list of RDSO Vendor Directory for Side Bearer of locomotive bogies.
- 3.2 The inspection of side bearers shall be carried out as per the instructions given in the RDSO Vendor Directory. Purchaser shall clearly indicate the Inspecting Agency in the Purchase Order.
- 3.3 The purchase order shall bear reference of this Specification.

4.0 REFERENCE TO SPECIFICATIONS AND STANDARDS

- 4.1 This specification draws reference to the following IS specifications and ISO standards. The manufacturer shall have a copy of latest versions of these specifications:

Sl.	Spec. No.	Description
1.	IS: 3400: Part 1	Methods of Test for Vulcanized Rubbers - Tensile Stress -Strain Properties
2.	IS: 3400: Part 2	Methods of Test for Vulcanized Rubber – Rubber, Vulcanized or Thermoplastic – Determination of Hardness (Hardness between 10 IRHD and 100 IRHD)
3.	IS: 3400: Part 4	Methods of Test for Vulcanized Rubbers - Accelerated Ageing
4.	IS: 3400: Part 9	Methods of Test for Vulcanized Rubber – Rubber, Vulcanized – Determination of Density
5.	IS: 3400: Part 10	Methods of Test for Vulcanized Rubbers - Compression Set at Constant Strain
6.	IS: 3400: Part 14	Methods of Test for Vulcanized Rubbers - Adhesion of Rubber to Metal
7.	IS: 3400: Part 22	Methods of Test for Vulcanized Rubbers - Chemical Analysis
8.	IS: 2102: Part 1	General Tolerances – Tolerances for linear & angular dimensions without individual tolerance indications
9.	IS: 2062	Steel for General Structural Purposes
10.	IS: 9139	Malleable Iron Shots and Grits for Use in Foundries
11.	ISO: 3302: Part 1	Rubber- tolerances for products - Dimensional tolerances

5.0 DEVIATION (S)

- 5.1 Deviations from this specification and RDSO drawing no. SK.VL-127(Rev-11 or Latest) shall not be accepted normally. However, any suggestions of the manufacturer for improvement in the life or performance of side bearers may be considered. In such cases, a specific request shall be referred to RDSO, which shall be studied in regard to the impact on the life of side bearers and fitment of the assembly. However any changes in the dimensions affecting the height, fitment and load-deflection characteristics of side bearers shall not be accepted. Railways are required to forward such specific proposal to RDSO indicating the deviation(s) from the relevant Drawing / Specification with justification & recommendations furnished by the manufacturer for consideration of the deviation(s).
- 5.2 The manufacturer shall not commence side bearer manufacture with the proposed deviation(s) till the deviations are accepted and clearance is given by RDSO.

6.0 REQUIREMENTS

6.1 Material

6.1.1 Rubber

The side bearer shall be manufactured from natural rubber suitably compounded to conform to the requirements stipulated in this specification. The rubber compound shall conform to the following stipulations:

- i. The Ash Content shall not exceed 8% and shall be checked as per method specified in IS: 3400 (Part-22).
- ii. The Specific Gravity shall not exceed 1.22 and shall be checked as per method specified in IS: 3400 (Part-IX).

6.1.2 Steel

The end mounting plates and interleaves shall be of steel conforming to IS: 2062 Gr.-E250 Quality A.

6.2 Dimensions and Tolerances

6.2.1 The dimensions and tolerances of the side bearer shall be as per the relevant drawing.

6.2.2 Un-toleranced dimensions of steel plates shall have tolerances as per IS: 2102 (Medium).

6.2.3 Un-toleranced rubber dimensions shall have tolerances as per Table 1 of ISO: 3302, Class - M4.

6.3 Manufacture and Finish

6.3.1 The manufacturing of side bearer shall be done by injection moulding process only.

6.3.2 During preparation of metal plates for side bearers, it should be ensured that:

- a) All sharp edges and burrs are removed from the steel plates.
- b) The metal plates are chemically cleaned / degreased before shot blasting.
- c) The metal plates are then shot / grit blasted.
- d) The surface of metal plate to be used in side bearers is free from rust, moisture, oily substances, metal oxide, non-oily contaminants and other foreign particles before applying primer coat.

Note: Before applying primer coat for achieving the required bond strength between metal plates and rubber, the metal plates that are ready for use, should be stored suitably to avoid contamination of the surface. The process and bonding agent adopted for bonding of rubber to metal plate shall be of proven quality. Chemlok as bonding agent is recommended.

6.3.3 The moulding temperature and time shall be optimized using a Rheometer for proper curing of rubber.

6.3.4 The rubber shall be smooth and free from pinholes, blisters and other manufacturing flaws.

6.4 Technical Requirements

6.4.1 Physical Properties of Rubber Compound

The physical properties of rubber compound shall be checked as per method given in IS Specification mentioned below and shall conform to the following limits:

Sl.	Properties	Method / Standard	Permissible limit
1.	Tensile strength (kg/cm ²), min.	IS: 3400: Part 1	210
2.	Elongation at break (%), min.	IS: 3400: Part 1	450
3.	Compression set (%) at 70 ± 1°C for 24 +0 / -2 hrs. max.	IS: 3400: Part 10	20
4.	Hardness (Shore 'A')	IS: 3400: Part 2	50-60

The manufacturer shall carry out the above tests on test pieces prepared from side bearers.

6.4.2 Accelerated Ageing

The manufacturer shall carry out accelerated ageing tests on test pieces prepared from the same side bearer which was used for preparing test pieces for checking physical properties of rubber compound as stated in Para 6.4.1. The method for conducting accelerated ageing test shall be as stated in IS: 3400: Part 4 to check the accelerated ageing properties of rubber compound and their conformance with the permissible limits.

After ageing at 70 ± 1° C in an air oven for 72 hours, the hardness, tensile strength and elongation at break shall not vary from the values obtained with the un-aged specimens beyond the limits given below:

Sl.	Properties	Permissible Limit
1.	Hardness (Shore 'A')	+ 7 - 0
2.	Tensile strength	± 20 %
3.	Elongation at break (%)	+ 5 % - 20 %

6.4.3 Compressive Load–Deflection Characteristics

The side bearer shall be subjected to three successive loadings up to 16 tonnes. During the fourth cycle, the side bearer shall be compressed with a preload of 50 kg and deflection taken as 'zero' at this point. The deflection at loads of 7.5, 11.0 and 16.0 tonnes shall be recorded with the help of dial gauge (s) / digital read out. The loading / unloading of the side bearer shall be done sufficiently slow so that the deflection of the pads is not affected by heat generated due to sudden application of test loads. The deflection values at various loads shall be within the permissible deflection limits mentioned below:

Sl	Load (Tonnes)	Other locomotives except WDP1 (in mm)	Permissible Tolerance (%)	WDP1 class of locomotives (in mm)	Permissible Tolerance (%)
1.	7.50	12.5	± 10%	14.00	± 10%
2.	11.00	17.0	± 10%	19.00	± 10%
3.	16.00	23.0	± 10%	26.00	± 10%

6.4.4 Shear Load-Deflection Characteristics

The test shall be carried out as per the arrangement shown in Sketch No. SK.VL-135 (Rev-04 or latest). Two side bearers coupled together shall be held suitably at a compressive load of 200 kg.

The assembly then shall be subjected to shear load applied on the mounting plates of two side bearers coupled together, three times successively up to 5 tonnes at a slow speed. During the fourth cycle, the deflection values in shear mode shall be recorded at loads of 2 tonnes and 4 tonnes using a dial gauge (s) / digital read out. The deflection values shall be within the limits given below:

Sl	Load in tonnes	Other locomotives except WDP1 (in mm)	Permissible Tolerance (%)	WDP1 class of locomotives (in mm)	Permissible Tolerance (%)
1.	2.0	25.0	±15%	30.00	±15%
2.	4.0	56.0	±15%	66.00	±15%

6.4.5 Shear Bond Strength

The bond strength between metal plates and rubber shall be checked as per Method 'B' of IS: 3400: Part 14 and shall be minimum 35 kg / cm².

The preparation of Test Piece for the Shear Bond Strength test shall be similar to the process for preparation of metal plates and bonding procedure followed during manufacturing of the product.

6.4.6 Fatigue Test

Two side bearers shall be subjected to fatigue test for 1 million cycles as per test scheme placed at **Annexure-I** to check the quality of manufacturing process by the way of verifying the product fatigue life. The test shall be carried out in the manufacturer's premises for which the manufacturer shall have all the necessary testing facilities.

7.0 LOT SIZE, SAMPLING AND CONFIRMATORY TESTS

7.1 The manufacturer shall submit Quality Assurance Plan (QAP) of side bearer as per the standard format to Motive Power Directorate, RDSO for approval. QAP shall cover all aspects of process / quality control requirement to obtain quality product.

7.2 The Inspecting Agency for the purpose of inspection of the product in reference to a Purchase Order shall carry out the checks as given below:

7.3 The Inspecting Agency shall verify the following before carrying out inspection of side bearers:

- i. The delivery period of the Purchase Order is valid.
- ii. Check the Internal inspection record carried out at various stages of manufacture of the product by the manufacturer's quality control for the product being offered and the results of internal inspection records are in order.
- iii. Verify that the manufacturer is strictly adhering to all the stipulations of its "Quality Assurance Plan (QAP)" during manufacturing.
- iv. The measuring instruments, gauges, testing facilities, etc are in working order and they are calibrated.
- v. The latest copies of all the reference specifications mentioned in Para - 4 are available with the manufacturer.
- vi. Check the record for fatigue test of the product carried out by the firm as per Para 7.6 of this specification.

7.4 The lot size of side bearers to be offered in one inspection shall be 50 nos. or full quantity, if the order is for less than 50 nos.

7.5 The sample size, which shall be drawn by the Inspecting Agency from each lot of side bearers offered for inspection is detailed below. These samples are to be tested for conformance with the permissible values given in Para 6 of this specification.

The number of samples to be drawn for test per lot shall be as follows:

For Non-Destructive Testing: Two samples shall be selected per lot, which shall be subjected to the following non-destructive tests:

Sl.	Test
1.	Dimensions

2.	Visual Examination
3.	Compressive Load-Deflection Characteristics
4.	Shear Load-Deflection Characteristics

For Destructive Testing: Two samples shall be selected per lot, which shall be subjected to the following destructive tests:

Sl.	Test
1.	Accelerated Ageing of Rubber Compound
2.	Shear Bond Strength
3.	Physical Properties of Rubber Compound
4.	Physical Properties of Metal Plates
5.	Specific Gravity
6.	Ash Content
7.	Hardness (Shore 'A')

Note: The samples of side bearer selected for destructive testing shall be used for conducting all the tests given under the head of Destructive Testing. The test piece / test sample shall be prepared from the side bearers drawn during sampling, which shall be different from those selected for non-destructive testing. If the results are found acceptable, the Inspecting Authority shall place his seal on samples on which non-destructive testing was done, which shall be part of the delivery.

7.6 The fatigue test shall be carried out using two samples together drawn from the quantity offered by manufacturer for inspection from the first purchase order of the year. The Inspecting Agency shall witness the test. Since the fatigue test may take considerable time, the sealing of the loading cycle counter of the fatigue testing machine and identification on the side bearers being tested shall be done by the Inspecting Agency. The manufacturer shall ensure that the seal and the marking on the side bearer is not tempered till the test is completed and the Inspecting Agency has authorized the removal of the same. The Inspecting Agency is required to witness at least the starting and finishing of the fatigue test. The Inspecting Agency shall issue an inspection note on successful completion of fatigue testing, which shall be valid for one year, on presentation of this inspection note by the manufacturer, fatigue testing of side bearer for the subsequent purchase orders during the year shall not be required.

7.7 Acceptance Criteria

7.7.1 The material offered for inspection shall not be withdrawn during the course of inspection by the manufacturer. Any move to withdraw the material / interfere / hinder with the inspection, by the manufacturer in any way, shall render the rejection of the entire quantity of material offered for inspection.

7.7.2 If any sample fails in one or more criteria given in Para 6 of this specification, double the sample size shall be drawn and tested against the criteria in which the failure had occurred. If all the samples of double sampling pass the criteria, the entire quantity shall be accepted.

7.7.3 Failure of any sample of the double samples will, however, result in rejection of the entire offered quantity. The intimation of the failure shall also be sent to RDSO with clear remarks whether the manufacturer is adhering to its QAP. In case of deviation, a corrective action must be ensured at the earliest.

7.7.4 In case the manufacturer is failing to adhere to its approved QAP and the material has also failed during inspection, the material stands rejected and further inspection of material stands withheld with the manufacturer. A report shall be issued by the inspecting agency to RDSO for initiating action against the manufacturer on account of its failure to abide by its QAP.

7.7.5 In the event of rejection, the entire quantity offered for inspection shall be made un-usable for railway application in the presence of the Inspecting Agency.

8.0 STAMPING

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

9.0 PROCESS AUDIT CHECK

9.1 This is an audit check regarding manufacturer's adherence to its own quality assurance plan and its general quality consciousness. This audit shall be carried out as may be required by RDSO for improving the life / performance of side bearers or in case reports of premature product failure are received. The samples shall be collected for carrying out the following tests:

9.1.1 Three samples of side bearer, out of which one sample shall be cut open to prepare six dumb bells and six buttons for detailed testing.

9.1.2 Out of three side bearers, two shall be fatigue tested for 1 million cycles to determine the fatigue life as per the test scheme placed at **Annexure I**.

9.1.3 If any of the samples fail during testing in one or more attributes, the manufacturer shall face the process of de-listing as an approved RDSO vendor for this product.

10.0 MARKING

10.1 Each side bearer shall be punched / engraved on the metal plate as follows:

- a) Drawing number
- b) Manufacturer's name (initial / trade mark)
- c) Month and the year of manufacture
- d) Serial number / Batch number

10.2 The punching / engraving shall be of the size and at the location as shown in the RDSO Drawing. no. SK.VL-127 (Rev-11 or latest).

11.0 PACKING

The side bearers shall be dusted with French chalk and suitably packed in wooden box to protect them against any damage during transit and storage.

12.0 STORAGE

The side bearers shall be stored in a cool and dry place.

13.0 Vendor changes in approved status

All the provisions contained in RDSO's ISO procedures laid down in document no. QO-D-8.1-11, dated 01.07.2020 or latest (Titled "Vendor changes in approved status) and subsequent version/amendment thereof, shall be binding and applicable on the successful vendor/vendors in the contract floated by Railways to maintain quality of products supplied to Railways.

14.0 PREFERENCE TO MAKE IN INDIA

The Government of India policy on `Make in India` shall apply.

15.0 INSPECTION

Inspection of conventional Side Bearers (Rubber Spring) under this specification shall be carried out as per the Inspection plan attached as Annexure-II.

16.0 Field Trial

After fitment of the component on locomotives, approval may be considered after satisfactory field performance. Field performance shall be monitored as per format attached as Annexure-III.

17.0 Date of Enforcement

For all the firms, the time frame for implementation of revised requirement/ facilities in the Specification shall be with effect from 01.01.2021.

TEST SCHEME FOR FATIGUE TESTING OF SIDE BEARERS**1.0 TEST OBJECTIVE**

These tests are required to assess the suitability of side bearers for locomotive bogies by simulating the actual service conditions in the laboratory.

2.0 TESTING PROCEDURE & OBSERVATIONS**2.1 Checking of Load-Deflection Characteristics**

2.1.1 The free height of side bearers shall be recorded.

2.1.2 The load-deflection characteristics of side bearers shall be checked in compressive mode as per procedure given in Para 6.4.3 of this specification. The deflection at compressive loads of 7.5 t, 11.0 t and 16.0 t shall be within the permissible limits given in Para 6.4.3.

2.1.3 If the load-deflection characteristics of side bearers in compressive mode are found to be within the permissible limits, then the load-deflection characteristics of side bearers shall be checked in shear mode as per procedure given in Para 6.4.4 of this specification. The deflection at shear loads of 2.0 t and 4.0 t shall be within the permissible limits given in Para 6.4.4.

2.2 Fatigue Test

2.2.1 The fatigue test on the side bearers shall be conducted only when the results of load-deflection characteristics are verified by the Inspecting Agency and the same conform to the permissible limits. If the load-deflection characteristics of side bearers do not conform to the specified limits, then fatigue test on the side bearers shall not be carried out and action shall be taken as per guidelines given under Para 7.6 of this specification.

2.2.2 The fatigue test shall be carried out as per the arrangement shown in the Sketch SK.VL-135 (Rev-04 or latest). Two samples coupled with each other shall be subjected to constant vertical load and a uni-directional variable lateral deflection applied along the mating surfaces of the two pads for one million cycles of fatigue testing. These cycles shall be divided into 3 stages. The vertical load on the coupled pads, the number of cycles applied and variable lateral deflection for each stage are given below:

Stage	Vertical Load	No. of Cycles	Variable Lateral Deflection
1.	12 t	4 lakh	55 - 60 mm
2.	14 t	4 lakh	45 - 50 mm
3.	16 t	2 lakh	35 - 40 mm

2.2.3 The load-deflection characteristics shall be checked both in compressive and shear modes after completion of each stage of fatigue test.

2.2.4 The fatigue test shall be carried out at a frequency of 1 cycle per second.

2.2.5 The samples shall be rotated by 180° after completion of each stage of fatigue test.

2.2.6 The free height of side bearers shall be checked 30 minutes after completion of fatigue test and permanent set shall be recorded. The permanent set in each pad shall not be more than 4.0 mm.

2.2.7 The side bearer shall be checked for cracks, perishing signs and bond failure. If such signs are observed during fatigue testing, it shall be recorded and action shall be taken as detailed below:

The side bearer pad shall be considered as "failed" if any one of the following limits is exceeded:

i. If a crack in a rubber exceeds 25 mm in length and 10 mm in depth in any layer or if the accumulated cracks exceed 100 mm in length and 10 mm in depth in side bearer.

ii. If de-bonding of rubber from metal plate exceeds 15 mm in depth and / or a total length of 100 mm on any one rubber / metal interface.

iii. If crack is observed in any of the metal plate.

INSPECTION PLAN FOR CONVENTIONAL SIDE BEARER (RUBBER SPRING) FOR LOCOMOTIVE BOGIES

1. SCOPE

This inspection plan covers the checks to be carried out by the Authorized Inspecting Agency during inspection of "Conventional Side Bearer (Rubber Spring)" for locomotive bogies and on the manufacturer in reference to the Purchase Order. The Conventional Side Bearer (Rubber Spring) shall be subjected to inspection by the Authorized Inspecting Agency as detailed in this Inspection Plan to ascertain their quality.

2. CONTRACT DOCUMENTS

Sr.	Descriptions
1.	Purchase Order in reference
2.	Drawing(s) referred in Purchase Order
3.	Quality Assurance Plan of the firm for Conventional Side Bearer (Rubber Spring)

3. DEFINITIONS

The various abbreviations used in this inspection plan and their interpretations are tabulated as follows:

Sr.	Abbreviations	Descriptions
1.	Firm / Manufacturer	Manufacturer on which PO in reference is placed
2.	Inspector	Authorised Representative of Inspecting Agency
3.	IP	Inspection Plan
4.	PO	Purchase Order
5.	QAP	Quality Assurance Plan

4. FACILITIES FOR INSPECTION

- 4.1 The Inspector shall be permitted to carry out all the checks included in this Inspection Plan.
- 4.2 The Inspector shall have free access to the works of the manufacturer at all reasonable times. He shall be at liberty to reject any material that does not conform to the relevant drawing/ specification.
- 4.3 The manufacturer shall provide free of charge, all the facilities to the Inspector, such as labor, measuring instruments, testing facilities and necessary assistance in carrying out all the tests in accordance with this Inspection Plan. If facilities for carrying out any checks mentioned in this Inspection Plan are not available at manufacturer's works, the manufacturer shall arrange such checks elsewhere at their expense.

5. GENERAL CHECKS BY THE INSPECTOR

Before commencing the inspection, the Inspector shall ensure that:

- 5.1 The delivery period of the Purchase Order is valid.
- 5.2 Valid copies of QAP and relevant drawings as per the P.O are available.
- 5.3 Check the internal inspection records carried out at various stages of manufacture of the product by the firm's quality control department for the product being offered and confirm that the results of the internal inspection records are in order.
- 5.4 The measuring instruments, gauges, testing facilities etc are in working order and they are properly calibrated.
- 5.5 The copies of latest versions of all the reference specifications are available with the firm.
- 5.6 The observations on general checks carried out by inspecting agency shall be recorded in Format-I.

6. INSPECTION PROCEDURE

6.1 Lot Size

The lot size of Conventional Side Bearer (Rubber Spring) to be offered in one inspection shall be 50 nos. respectively or full quantity if the order is for less than the above numbers.

6.2 Sample Size

Sample size for various tests indicated below shall be drawn from the lots offered for inspection by the representative of Authorized Inspecting Agency.

Non-Destructive Testing: Two samples shall be selected per lot, which shall be subjected to the following non-destructive tests:

Sl.	Test
5.	Dimensions
6.	Visual Examination
7.	Compressive Load-Deflection Characteristics
8.	Shear Load-Deflection Characteristics

Destructive Testing: Two samples shall be selected per lot, which shall be subjected to the following destructive tests:

Sl.	Test
8.	Accelerated Ageing of Rubber Compound
9.	Shear Bond Strength
10.	Physical Properties of Rubber Compound
11.	Physical Properties of Metal Plates
12.	Specific Gravity
13.	Ash Content
14.	Hardness (Shore 'A')

Fatigue Test: - This test is carried out as per Annexure –I of Specification No VL-03.

Note:

The samples of Conventional Side Bearer (Rubber Spring) selected for destructive testing shall be used for conducting all the tests given under the head of Destructive Testing. The test piece / test sample shall be prepared from the Conventional Side Bearer (Rubber Spring) drawn during sampling, which shall be different from those selected for non-destructive testing. If the results are found acceptable the Inspecting Authority shall place his seal on these samples, which shall be part of the delivery.

The fatigue test shall be carried out using two samples together drawn from the quantity offered for inspection from the first purchase order in a year by vendor. The Inspecting Agency shall witness the test. Since the fatigue test may take considerable time, the sealing of the loading cycle counter of the fatigue testing machine and identification on the conventional rubber side bearer being tested shall be done by the Inspecting Agency. The firm shall ensure that the seal and the marking on the Conventional Side Bearer (Rubber Spring) is not tempered till the test is completed and the Inspecting Agency has authorized the removal of the same. The Inspecting Agency is required to witness at least the starting and finishing of the fatigue test. The Inspecting Agency shall issue an inspection note on successful completion of fatigue testing, which shall be valid for one year, on presentation of this inspection note by the firm, fatigue testing of side bearer for the subsequent purchase orders during the year shall not be required. .

6.3 Acceptance Criteria

- .1 The material offered for inspection shall not be withdrawn during the course of inspection by the firm. Any move to withdraw the material/ interfere/ hinder with the inspection, by the firm in any way, shall render the rejection of the entire quantity of material offered for inspection.
- .2 If any sample fails in one or more criteria given in Para 6 of this IP, double the sample size shall be drawn and tested against the criteria in which the failure had occurred. If all the samples of double sampling pass the criteria, the entire quantity shall be accepted.
- .3 Failure of any sample of the double samples will, however, result in rejection of the entire offered quantity. The intimation of the failure shall also be sent to RDSO with clear remarks whether the firm is adhering to its QAP.
- .4 In case the firm is failing to adhere to its QAP and the material has also failed during inspection, the material stands rejected and further inspection of material stands withheld with the firm. A report shall be issued by the inspecting agency to RDSO for initiating action against the firm on account of its failure to abide its QAP.
- .5 In the event of rejection, the entire quantity offered for inspection shall be made unusable for Railway application in presence of the Inspecting Agency.

6.4 Stamping

The Conventional Side Bearer (Rubber Spring) which has been inspected and passed shall be double stamped by the Inspecting Agency. The entire quantity of Conventional Side Bearer (Rubber Spring) from which the sampling has been done shall be stamped (single stamp mark) by the Inspecting Agency.

6.5 Marking

The material offered for inspection shall be suitably marked containing the following information with letter height of 6 mm size on metal:

- .1 Drawing No.
- .2 Manufacturer's Name
- .3 Month and year of manufacture
- .4 Serial Number/Batch No.

6.6 Packing

The Conventional Side Bearer (Rubber Spring) shall be dusted with French chalk and suitably packed in wooden box to protect them against damage during transit and storage.

GENERAL CHECK SHEET

Sr.	Description	Observations
1.	Name of Component	
2.	Firm's Name	
3.	Date (Period) of Inspection	
4.	Contract Details	
	a. Purchase Order No. & Date	
	b. P.O placing Authority	
	c. Drawing No. as per P.O.	
	d. Inspecting Authority as per P.O.	
5.	Quantity on P.O.	
6.	Quantity offered for Inspection	
7.	Consignee	
8.	Validity of D.P. of P.O.	
9.	Remarks on internal checks carried out by the firm	
10	Remarks on calibration of Measuring Instruments and Testing Facilities	
11.	Remarks on availability of copies of latest versions of Specifications & Standards referred	

Quality Control Manager of Firm	Authorised Representative of Inspecting Agency

MATERIAL PROPERTIES CHECK SHEET

A. Raw Material Checks

i) Rubber Compound Check

Specified Sample/ Lot Size: _____ Whether material conforms to Specification (Yes / No): _____

Raw Material	Material Specified	Observations
Rubber compound	Natural rubber	

ii) Check for Material of Metal plates:

Specified sample size-02 Nos

Actual sample size-

Parameters	Specified value	Observed value		Remarks
		1	2	
Physical property of metal plates	As Per IS : 2062 Gr.E250			
Metal plates	No. Sharp edges & burrs			

B. Physical properties of Rubber Compound

i) Tensile Strength (Minimum Specified Value: 210 kg /cm²)

Parameters		Observed Value						Remarks
		Sample 1			Sample 2			
		a	b	c	a	b	c	
Sample Size (Sample has to be taken as per IS:3400 Part-1)	Thickness							
	Width							
	Area							
Load at Break (kg)								
Tensile Strength (kg/cm ²)								
Avg. value (kg/cm ²)								

ii) Elongation at Break (Specified Value: 450% Minimum)

Parameters	Observed Value (Samples to be taken as per IS:3400 Part-1)						Remarks
	Sample 1			Sample 2			
	a	b	c	a	b	c	
Bench Length (cm)							
Length at Break (cm)							
Elongation (%)							
Avg. Value (%)							

iii) Hardness (Specified Value: 50-60 Shore A)

Parameters	Observed Value	Remarks

	Sample 1					Sample 2					
	a	b	c	d	e	a	b	c	d	e	
Hardness											
Avg. Value											

iv) Compression set

Test Conditions: Temperature: $70 \pm 1^{\circ}\text{C}$ for $24 +0 / -2$ hrs (Specified Value: 20% Max)

Parameters	Observed Value						Remarks
	Sample 1			Sample 2			
	a	b	c	a	b	c	
Thickness of Spacer							
Thickness (Before Ageing)							
Thickness (After Ageing)							
Compression Set							
Avg. Value (%)							

2. Heat Resistance Test

Test Conditions: Temperature: $70 \pm 1^{\circ}\text{C}$ in air oven for 72 hours

a. Tensile Strength (Specified Value: Maximum permissible variation of $\pm 20\%$)

Parameters		Observed Value						Remarks
		Sample 1			Sample 2			
		a	b	c	a	b	c	
Sample Size (Sample has to be taken as per IS:3400 Part-1)	Thickness							
	Width							
	Area							
Load at Break (kg)								
Tensile Strength (kg/cm ²)								
Avg. Value (kg/cm ²)								

b. Elongation at Break (Specified Value: Maximum permissible variation of $+5\%/-20\%$)

Parameters	Observed Value (Samples to be taken as per IS:3400 Part-1)						Remarks
	Sample 1			Sample 2			
	a	b	c	a	b	c	
Bench Length (cm)							
Length at Break (cm)							
Elongation (%)							
Avg. Value (%)							

c. Hardness (Specified Value: Permissible variation of +7/0)

Parameters	Observed Value						Remarks
	Sample 1			Sample 2			
	a	b	c	a	b	c	
Hardness							
Avg. Value							
Variation in Hardness							

3. Ash Content:

S.No.	Sample 1		Sample 2	
1	Crusible Wt.		2	Crusible Wt.
	Cr+Sample Wt			Cr + Sample Wt
	Sample Wt			Sample Wt
	Cr. Ash Wt			Cr. + Ash Wt
	Ash Wt			Ash Wt
	Ash %			Ash %

4. Shear Bond Strength:

Parameters	Specified value (mm)	1	2
Shear bond Strength	35 kg/ sq.cm (Min.).		

5. Specific Gravity:

Parameters	Specified value (mm)	1	2
Specific Gravity	1.22 Max.		

6. Compressive Load- deflection

Load in Tones	Specified		Observed value in mm	
	Other locomotives except WDP1 (in mm)	WDP1 class of locomotives (in mm)	1	2
7.50	12.5 ± 10%	14.00 ± 10%		
11.00	17.0 ± 10%	19.00 ± 10%		
16.00	23.0 ± 10%	26.00 ± 10%		

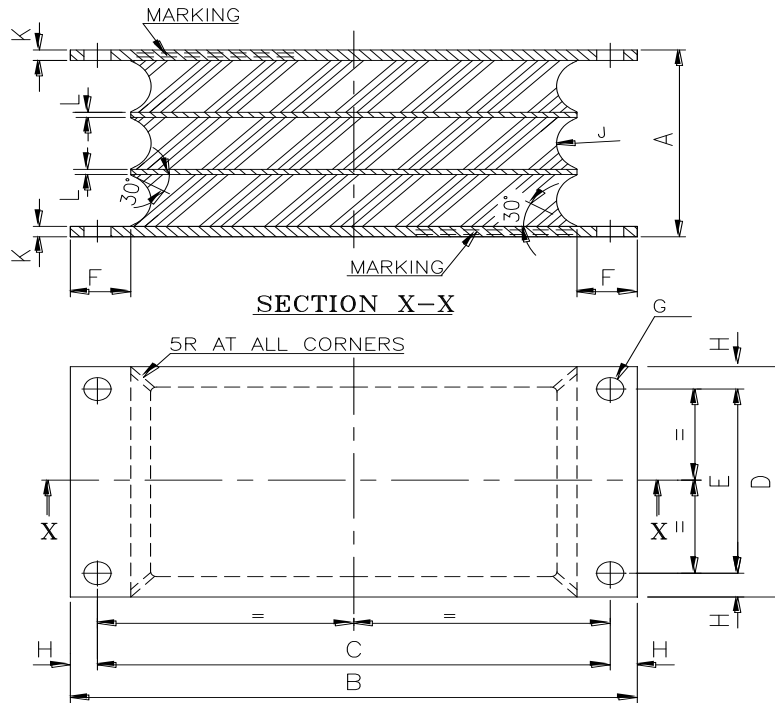
7. Shear Load- deflection Test

Load in Tones	Specified		Observed value in mm	
	Other locomotives except WDP1 (in mm)	WDP1 class of locomotives (in mm)	1	2
2.0	25.0 ± 15%	30.00 ± 15%		
4.0	56.0 ± 15%	66.00 ± 15%		

8. Visual Check

Sample No.	1	2	3	4
Visual Check				

9. Dimension check:



Notation	Dimensions as per drawing no.-----	Observed Dimensions in mm				Remarks on Fail/pass
		Sample1	Sample 2	Sample 3	Sample 4	
A						
B						
C						
D						
E						
F						
G						
H						
J						
K						
L						
Marking						

10. Fatigue Test: Done Date.....

Fatigue test: This test is carried out for 1.0 million cycles.

Is Fatigue testing has been done for this lot:

Yes/No

- If yes, then further fatigue testing is not required.
- If no, then the following procedure for fatigue testing is to be followed:

5. After completion of 1.0 Million cycles, observation are as under

Parameters	1	2	Remarks
Before fatigue (Free Height in mm)			
After fatigue (Free Height in mm)			
Permanent in mm (Not more than 4mm)			
De-bonding of rubber from metal plate			
Crack in any rubber			
Crack in any metal plate			

Annexure-III

**PROFORMA FOR REPORTING RUBBER SIDE BEARER PERFORMANCE OF LOCOMOTIVES
AS PER RDSO DRAWING NO. SK.VL-127.**

Shed Railway Date

S. No.	Loco No./ Type	Loco Commission Date	Side Bearer Make	Fitment Date	Failure Details				Remarks , if any
					Removal Date	Reason/ Type of Failure	Life Obtained Till Date	Investigation Report Particulars, if any	
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									