



भारत सरकार
रेल मंत्रालय

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

बी.जी. लोकोमोटिव्स के साइड बफ़र के लिये उच्च क्षमता वाले रबर
बफ़र स्प्रिंग की तकनीकी विशिष्टियाँ

**TECHNICAL SPECIFICATION
OF
HIGH CAPACITY RUBBER BUFFER SPRINGS
FOR SIDE BUFFERS OF B.G. LOCOMOTIVES**

Supersedes specification No. MP-0.41.00.04 (Rev.03)
(October 2011)

विशिष्टि सं. चा.श.- 0.41.00.04 :संशोधन (04)
नवम्बर' 2021

SPECIFICATION NO. MP- 0.41.00.04 (Rev .04)
November' 2021

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Summary of Modification made in final Spec. MP- 0.41.00.04 (Rev .04).

Page 1	2.1.1	Grade of IS: 2062 steel has been revised from Fe 410WA to E 250 A
Page 2	2.3.1	Acceptance of Equivalent BIS standard has been added along with ISO 3302 Part I
Page 2	2.4	STR no. has been revised to latest version.
Page 6	11.0	New Para for inclusion of 'Make in India' policy.
Page 7	12.0	New Para for inclusion of ISO doc no. QO-D-8.1-11 (Titled "Vendor – changes in approved status), its binding and application on the successful vendor/vendors in the contracts floated by Railways
Page 8	13.0	Field trial scheme and field performance feedback format has been included.
Page 9 to 17	Annexure-1	Inclusion of Test plan for prototype & regular inspection of High capacity Rubber buffer spring.

Summary of Modification made in final Spec. MP- 0.41.00.04 (Rev .03), Oct-2011

Page 4	Clause 5.3 (i)	The Spring Assembly shall be compressed 10000 times in the load range 2t to 15t and the pace of the stresses must not lead to overheating of the spring elements. Minimum frequency shall be 6 cycles/minute
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Summary of changes made in MP- 0.41.00.04 (Rev .03) from MP- 0.41.00.04 (Rev .02)

Page 4	Clause 5.3 (i)	The Spring Assembly shall be compressed 10000 times in the load range 2t to 20t and the pace of the stresses must not lead to overheating of the spring elements.
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Summary of changes made in MP- 0.41.00.04 (Rev .02) from MP- 0.41.00.04 (Rev .01)

Page 2	Clause 2.3.2	The range of Specific gravity 1.0-1.25 changed to 1.05-1.20(± 0.05)
Page 3	Clause 4.0	The absorbed energy $\geq 50\%$ changed to $\geq 40\%$.
Page 4	Clause 5.3	Endurance test load range, 2t to 10t changed to 2t to 20t.
Technical specification and STR of high capacity rubber buffer spring have been separately made i.e. spec.no. MP.0.41.00-04(Rev.02) jan.2011 and STR No. MP-STR-LD-01-03-11, dtd.02-02-2011.		

**TECHNICAL SPECIFICATION OF HIGH CAPACITY
RUBBER BUFFER SPRINGS FOR SIDE BUFFERS OF BG LOCOS**

0.0 FOREWORD

- 0.1** This specification covers the technical requirements relating to materials, construction and tests of high capacity Rubber Buffer Springs for Side Buffers of BG locos.
- 0.2** This schedule draws reference to some other relevant specifications. Latest version of these specifications shall be taken as reference.
- 0.3** Whenever there is a conflict among the stipulations in the present specification, drawing or any of the relevant specifications, the most stringent requirement shall apply.

1.0 SCOPE

- 0.1 This specification prescribes the requirements, method of sampling and tests for individual rubber spring as well as a pack of 4 such elements having 1500 Kg.m minimum capacity for Side Buffer of B.G Locomotives.

2.0 REQUIREMENTS

2.1 Material

- 2.1.1 Rubber: - Natural Rubber or elastomers or a blend thereof, suitably compounded shall be used for the manufacture of the rubber springs so as to conform to the requirements stipulated in this standard

Steel: - The metal plates used as integral part of the rubber spring shall conform to IS: 2062 E 250 A.

- 2.1.2 The metal plates shall be shot / grit blasted to IS: 9139 grade, SM300 or GM-30 and chemically cleaned before bonding with the rubber. The process adopted for bonding of rubber to metal shall be a proven one, using suitable bonding agent to achieve the required bond strength.
- 2.1.3 All sharp edges & burrs shall be removed from metal plates. Rubber shall be smooth and free from cracks, pin holes, foreign materials, trapped air blisters and other visual flaws.
- 2.1.4 The metal plates shall conform to geometrical dimensions as indicated on drawing.

2.2 Dimensions

Each side buffer shall be fitted with an assembly of 4 buffer spring elements. Each buffer spring element shall be as per RDSO drawing SK.DL-4565.

2.3 Construction and Finish

- 2.3.1 The rubber springs shall be manufactured so as to be interchangeable as a complete pack, meeting the manufactured height requirement of 448 +4/-4 mm. The boundary dimensions and tolerances shall be as per the drawing no SK.DL-4565 in the annexure. Wherever tolerance on rubber has not been specified, it shall be in accordance with clause of ISO 3302 Part I of Table I class M4 or equivalent BIS standard.
- 2.3.1 All sharp edges and burrs shall be removed from the metal plate. The rubber shall be smooth and free of pinholes, blisters and other visual flaws. The texture of the material should be homogenous and compact.
- 2.3.2 The rubber for elastomers utilized in manufacture of spring shall conform to characteristics indicated in Table-1.

Table -1

Characteristics	Test Method	Results to be obtained
Hardness Shore 'A'	IS : 3400 Part II	A) Hardness = 70 ± 5 B) After ageing for 72 hrs in air at 70°C Change -0 +5
Tensile Strength	IS : 3400 Part I	Tensile strength 180.0 Kg/cm ² (min.) after Ageing for 72 hrs at 70°C Change ± 20%
Elongation at Rupture		Elongation Min. 300 % after ageing for 3 days in air at 70°C Change ± 30%
200% Modulus of elasticity	IS : 3400 Part I	40.0 kg/cm ² (min) change in modulus of elasticity after 72 hrs ageing at 70°C shall be ±20%.
Compression set after 25% compression for 24 hrs at 70°C	IS : 3400 Part X	Compression set 30% maximum.
Specific Gravity	IS : 3400 Part IX	Prototype SG to be within 1.05–1.20 and a tolerance of ±0.05 over the SG of the prototype formulation to be maintained by the Manufacturer during regular manufacture.
Ash content	IS:3400 Part XXII	5% Max.

- 2.3.3 The rubber buffer springs shall be manufactured by injection moulding.

2.4 Schedule of Technical Requirements: As per STR No. MP-STR-LD-01-03-11 (Rev.01) or latest.

3.0 STROKE

The buffer spring shall have a stroke of 110 +0/-5 mm.

4.0 TESTS

Four buffer elements as per SK.DL-4565 of manufactured height 448 + 4 /-4 mm shall meet the following test requirements in static condition when tested as per item 5.1

Pre-compression force at 423 mm height	750 Kg	< F <	2000 Kg
Compressive force at 398 mm height	1000 Kg.	<F<	4000 Kg
Compressive force at 363 mm height	5000 Kg	< F <	15000 Kg
Compressive force at 313 mm height	50,000 Kg	< F <	100,000 Kg
Stored energy We*	>= 1500 Kg-m		
Absorbed energy with injection moulding	>=40% of Stored energy		

Note:- The energy absorption capacity shall be calculated from the area under the load displacement characteristic curve drawn from pack height after three compressions to pack height of 313 mm. For calculating the absorbed energy the graph is drawn in reverse releasing the load from pack height of 313 mm and obtaining the area under the load displacement curve. The difference in energy as a percentage of stored energy is the absorbed energy.

The stored energy is measured in kilogram meter (kgm)

5.0 CHARACTERISTICS OF SPRING STACK.

5.1 Static Characteristics Procedure

Four buffer spring elements (Each conforming to RDSO SK.DL-4565) shall be clamped together to simulate the actual working condition. This spring assembly shall be placed in a rig to act as a guide during compression test or when under dynamic load. The guide shall be either through the central hole or the external guide. The spring elements shall be centrally placed with reference to the guide. It shall be ensured that during the test, the spring assembly shall not come in contact with either the central guide or the external guide which might interfere with the compressive load applied and the stress rate.

The compressive load shall be applied at a speed of 15 mm ± 5 mm per minute.

The load displacement curve from original height to the height at 313 mm shall be recorded at 4th stroke. 3 compression strokes upto a height of 313 mm shall be given on Buffer Springs. The zero settings for measurement for displacement shall be done prior to 4th compression by putting weight of 50 Kg so as to close any gap between the pads.

Results:

Values required in Item 4.0 shall be read from the graph plotted above. Assembly shall satisfy stipulations of Item 4.0.

5.2 Test of Compression Strength after clamping

Procedure:

The spring assembly shall be clamped to a height of 423 mm \pm 2 mm (pre compressed height).It shall be kept in this manner for 72 hours at room temperature.

It shall then be compressed from free height to a height of 313 mm at a rate of 15mm \pm 5 per minute.

The Test Results i.e. force / displacement diagram shall be drawn during the 4th cycle of compression.

Results:

The assembly shall satisfy the characteristics mentioned in Item 4.0.

5.3 Endurance Test

Procedure:

The Spring Assembly of four pads shall be subjected to endurance test as follows: Repeated compression shall be made between load range 2t to 15t.

- i.) The Spring Assembly shall be compressed 10000 times in the load range 2t to 15t and the pace of the stresses must not lead to overheating of the spring elements. Minimum frequency shall be 6 cycles/minute.
- ii.) The Spring in unclamped condition shall be kept for 24 hours for stabilisation.
- iii.) Compression curve shall be plotted after the third cycle of compression in the load of range 2t to 15t. The compression speed shall be 15mm \pm 5mm per minute.
- iv.) The Load necessary to obtain height of 423 mm shall be plotted based on (iii).

Note: - The Manufacturer shall have necessary facilities for carrying out endurance testing on such lot.

Results:

- i) Stored energy in the load range of 2t to 15t recorded in this test shall not be less than 80% of the corresponding stored energy recorded during the compression test after clamping in item 5.2
- ii) The force required to obtain the height of 423 mm shall not be less than 750 Kg.

5.4 Impact Endurance Tests:

A pack of four springs pre-compressed to 423 mm and two parting plates of 3.0 mm thickness (each) shall be subjected to 500 blows by a 1000 Kg load falling freely from a height of 1 m . The number of blows shall not be less than 30 per hour. The capacity when measured after half an hour after completion of this test shall not be less than 85% of the capacity recorded under item 4.0. Bond failure in any individual spring of the pack shall be considered as failed pack.

6.0 SAMPLING AND ACCEPTANCE

6.1 Acceptance test shall consist of following tests:

- i. Dimension check
- ii. Visual examination
- iii. Physical properties of elastomer before and after heat ageing (as Per Table I)
- iv. Static Characteristics.
- v. Compression after clamping
- vi. Endurance test
- vii. Impact endurance test
- viii. Compression set
- ix. Specific gravity
- x. Ash content

6.2 A batch shall consist of spring elements of the same type and of the same overall dimension coming from the same production series in accordance with the provision of the order. The spring element shall be tested as under :

Nature of Inspection	No of samples (packs)		No of measurement per sample
	Up to 500	: More Than 500	

1. Physical properties in as delivered condition and also after heat ageing.

Hardness	1	2	3
Tensile Test	1	2	3
Compression	1	2	3
Specific Gravity	1	2	1
Ash Content	1	2	1

2. Dimensional check on element

Visual Examination.	5	10
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3. Testing on the whole Spring assembly (consisting of 4 elements as used)

Static characteristics	4	8
Compression	1	2
Endurance test	1	2
Impact Endurance test	1	2

6.3 The test pieces selected at random shall be marked with indelible ink. The test pieces as selected above shall be prepared for 24 hours at 27°C ± 2°C

6.4 The test pieces to be tested after accelerated ageing shall be cut up and then oven heated upto 70°C for 3 days. They shall then be prepared for 24 hours at 27°C ± 2°C. The test shall be carried out in accordance with IS: 3400 part –IV latest.

6.5 If the sample fail on one or more of the criteria ' double' the number of the sample shall be drawn & tested against the criteria in which the failure has occurred. If the 'double' sample passes the test, the lot shall be accepted. Failure of 'double' sample shall however, result in rejection of the entire lot.

7.0 GUARANTEE

The firm shall stand guarantee for a period of 24 months from the date of supply regarding performance of Rubber Buffer Spring Element.

The spring elements, which during the guarantee period show manufacturing defects making them unsuitable for use or liable to shorten their service life shall be rejected. Joint inspection between the suppliers and the Railways shall be carried out before final rejection of the supplies by the Railways. The supply shall stand finally rejected if the joint inspection confirms that spring element had inherent manufacturing defects.

8.0 MARKINGS

8.1 Each Rubber Spring shall be embossed in raised letters on the Rubber portion as follows:

1. Drawing Number
2. Manufacturer's Name (Initial, Trade mark can also be embossed)
3. Quarter and Year of manufacture

The embossing shall be of the size and on the location shown in the drawing.

9.0 PACKING

Rubber Spring shall be dusted with french chalk and packed as multiple of four Rubber Spring Elements for Side Buffer Assembly to avoid any distortion and to prevent any damage during transit & storage.

10.0 STORAGE

10.1 The Rubber Spring shall be stored in a cool and dry place.

10.2 Pads shall be kept covered and free from exposure to bright light particularly sunlight.

10.3 Rubber pads shall not be exposed to Grease, Oil, Solvent Fumes or sources of Ozone such as Electric Motors or Generators.

10.4 Pads shall be stocked and arranged in such order to ensure use of old stock first.

11.0 PREFERENCE TO MAKE IN INDIA

The Govt. of India policy on 'Make in India' shall apply.

12.0 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 24.09.2021 (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.

13.0 FIELD TRIAL:

After successful prototype development and testing in accordance with the test plan given at Annexure-1, field performance of the Rubber buffer spring shall be monitored for the quantity and period as specified in RDSO master list (MP-M-8.1-1 latest version).

To monitor field performance, quantity given in master list shall be fitted in loco side buffers and their performance shall be monitored for the period specified in RDSO master list (MP-M-8.1-1 latest version).

Field performance feedback will be obtained from zonal railways/ loco sheds in format as under:

S. No.	Shed/ Rly.	Loco No.	Date of fitment	Date of failure, if any	Reason of failure	Remarks on performance

The acceptance criteria of field trial shall be the satisfactory field performance of the rubber buffer springs.

Annexure-1**Test plan for prototype & regular inspection of High capacity Rubber buffer spring**

(SK.DL-4565)

SN	Parameters	Specified Value	Observation		Result
1.1.1	Dimensional Check	As per drg. SK.DL-4565			
1.1.2	VISUAL CHECK	No sharp edges or burrs on metal plates. Rubber shall be smooth and free from cracks, pin holes, foreign materials, trapped air blisters and other visual flaws. & marking			
1.1.3	Physical Properties before ageing		Max.	Min.	
a)	Hardness Shore 'A'	70 ± 5			
b)	Tensile Strength	Min 180 Kg/cm ²			
c)	Elongation at rupture	Min 300%			
d)	Modulus of elasticity at 200%	Min 40 kg/cm ²			
1.1.4	Change in physical properties after ageing at 70^oC for 72±0/- Hrs.		Max.	Min.	
a)	Hardness Shore 'A'	+5/-0			
b)	Tensile Strength	± 20%			
c)	Elongation at rupture	± 30%			
d)	Modulus of elasticity at 200%	± 20%			
1.1.5	Static characteristics	To conform to Cl.5.1 of spec.			
1.1.6	Compression after clamping	To conform to Cl.5.2 of spec.			
1.1.7	Endurance Test	To conform to Cl.5.3 of spec.			
1.1.8	Impact endurance test	To conform to Cl.5.4 of spec.			
1.1.9	Compression set	Max 30%			
1.1.10	Specific gravity	Value of SG shall be maintained as mentioned in approved QAP of the firm in regular manufacture and tolerance of ±0.05 over the SG of the prototype formulation.			
1.1.11	Ash content	5% max.			

1.1.1 Dimensional Check: (As per drg. SK.DL-4565)

Sample Size: 5 packs for the lot of 500 packs / 10 packs for the lot of more than 500 packs

DIMENSION	Observation									
Material of Steel plates: IS: 2062 E 250 A										
Steel plate outer dia 168 +0.0/ -1.0										
Steel plate inner dia 42 +1.0/ -0.0										
Plate thickness 5 ± 0.1 mm										
Rubber outer dia 136 +1.0/ -0.0										
Rubber inner dia 59 +1.0/ -0.0										
Distance between plates 16.5 ± 0.1 mm										
4 Holes Ø 12 PCD 108										
Radius 20 mm										
Radius 03 mm										
Total height 112 ± 1.0 mm										

1.1.2 Visual Check:

(No sharp edges or burrs on metal plates. Rubber shall be smooth and free from cracks, pin holes, foreign materials, trapped air blisters and other visual flaws. & marking)

Sample Size: 5 packs for the lot of 500 packs / 10 packs for the lot of more than 500 packs

Actual Sample:

Pad No.	1	2	3	4	5	6	7	8	9	10
Visual Check										
Pad No.	11	12	13	14	15	16	17	18	19	20
Visual Check										

1.1.3 Physical Properties before ageing.

Sample Size: 1 pack for the lot of 500 packs / 2 packs for the lot of more than 500 packs

Actual Sample:

A) Hardness:-

Parameters	Permissible Limit	1			2		
		a	b	c	a	b	c
Hardness Shore 'A'	70±5						
Mid Value							
Parameters	Permissible Limit	3			4		
		a	b	c	a	b	c
Hardness Shore 'A'	70±5						
Mid Value							

B) Tensile Strength :-

Parameters	Permissible Limit	1			2		
		a	b	c	a	b	c
Thickness (mm)							
Width (mm)							
Area (mm ²)							
Load at break (kg)							
Tensile Strength	180Kg/cm ² (min)						
Mid Value							
Parameters	Permissible Limit	3			4		
		a	b	c	a	b	c
Thickness (mm)							
Width (mm)							
Area (mm ²)							
Load at break (kg)							
Tensile Strength	180Kg/cm ² (min)						
Mid Value							

C) Elongation at rupture:

Parameters	Permissible Limit	1			2		
		a	b	c	a	b	c
Bench Length (mm)							
Length at break (mm)	80 (Min)						
Elongation (%)	300% min.						
Mid Value							
Parameters	Permissible Limit	3			4		
		a	b	c	a	b	c
Bench Length (mm)							
Length at break (mm)	80 (Min)						
Elongation (%)	300% min.						
Mid Value							

D) Modulus of elasticity at 200% :

Parameters	Permissible Limit	1			2		
		a	b	c	a	b	c
Thickness (mm)							
Width (mm)							
Area (mm ²)							
Load at 200% elongation							
200% Modulus of elasticity (kg/cm ²)	40Kg/cm ² (min)						
Mid Value							
Parameters	Permissible Limit	3			4		
		a	b	c	a	b	c
Thickness (mm)							
Width (mm)							
Area (mm ²)							
Load at 200% elongation							
200% Modulus of elasticity (kg/cm ²)	40Kg/cm ² (min)						
Mid Value							

1.1.4 Physical Properties after ageing.**Sample Size:** 1 pack for the lot of 500 packs / 2 packs for the lot of more than 500 packs**Actual Sample:****A) Hardness:-**

Parameters	Permissible Limit	1			2		
		a	b	c	a	b	c
Hardness Shore 'A'							
Mid Value							
Change in Hardness	+5 / -0						
Parameters	Permissible Limit	3			4		
		a	b	c	a	b	c
Hardness Shore 'A'							
Mid Value							
Change in Hardness	+5 / -0						

B) Tensile Strength :-

Parameters	Permissible Limit	1			2		
		a	b	c	a	b	c
Thickness (mm)							
Width (mm)							
Area (mm ²)							
Load at break (kg)							
Tensile Strength							
Mid Value							
Change after ageing	± 20%						
Parameters	Permissible Limit	3			4		
		a	b	c	a	b	c
Thickness (mm)							
Width (mm)							
Area (mm ²)							
Load at break (kg)							
Tensile Strength							
Mid Value							
Change after ageing	± 20%						

C) Elongation at rupture:

Parameters	Permissible Limit	1			2		
		a	b	c	a	b	c
Bench Length (mm)							
Length at break (mm)	80 min.						
Elongation (%)	300% min.						
Mid Value							
Change after ageing	± 30%						

Parameters	Permissible Limit	3			4		
		a	b	c	a	b	c
Bench Length (mm)							
Length at break (mm)	80 min.						
Elongation (%)	300% min.						
Mid Value							
Change after ageing	± 30%						

D) Modulus of elasticity at 200% :

Parameters	Permissible Limit	1			2		
		a	b	c	a	b	c
Thickness (mm)							
Width (mm)							
Area (mm ²)							
Load at 200% elongation							
200% Modulus of elasticity (kg/cm ²)	40Kg/cm ² (min)						
Mid Value							
Change after ageing	± 20%						
Parameters	Permissible Limit	3			4		
		a	b	c	a	b	c
Thickness (mm)							
Width (mm)							
Area (mm ²)							
Load at 200% elongation							
200% Modulus of elasticity (kg/cm ²)	40Kg/cm ² (min)						
Mid Value							
Change after ageing	± 20%						

**Details of Tests Carried out
Tests on whole Spring Assembly
(Consisting of 4 elements as used)
(Graphs are required to be plotted).**

1.1.5 Static Characteristics: (As per clause 5.1 of specification)

Sample Size: 4 packs for the lot of 500 packs / 8 packs for the lot of more than 500 packs

Actual Sample:

Pack No			1	2	3	4
a)	Free height (4 Buffer Element)	448 ± 4mm				
b)	Pre compression force at 423 mm height	750 kg<F<2000 Kg.				
c)	Compressive force at 398 mm height	1000 kg<F<4000 Kg.				
d)	Compressive force at 363 mm height	5000 kg<F<15000 Kg.				
e)	Compressive force at 313 mm height	50000 kg<F<100000 Kg.				
f)	Stored energy	>=1500 kg-m				
g)	Absorbed Energy	>=40% of stored energy				

Note: The energy absorption capacity shall be calculated from the area under the load displacement characteristic curve drawn from pack height after three compressions to pack height of 313 mm. For calculating the absorbed energy the graph is drawn in reverse releasing the load from pack height of 313 mm and obtaining the area under the load displacement curve. The difference in energy as a percentage of stored energy is the absorbed energy.

1.1.6 Test of Compression Strength after Clamping: (As per clause 5.2 of specification)

Sample Size: 1 packs for the lot of 500 packs / 2 packs for the lot of more than 500 packs

Actual Sample:

a)	Free height (4 Buffer Element)	448 ± 4mm	
b)	Pre compression force at 423 mm height	750 kg<F<2000 Kg.	
c)	Compressive force at 398 mm height	1000 kg<F<4000 Kg.	
d)	Compressive force at 363 mm height	5000 kg<F<15000 Kg.	
e)	Compressive force at 313 mm height	50000 kg<F<100000 Kg.	
f)	Stored energy	>=1500 kgm	
g)	Absorbed Energy	>=40% of stored energy	

1.1.7 Endurance Test (As per clause 5.3 of specification)

Sample Size: 1 packs for the lot of 500 packs / 2 packs for the lot of more than 500 packs

Actual Sample:

	Endurance Test	Specified Value	
a)	Stored energy in load range of 2t to 15 t	Shall not be less than 80% of the corresponding stored energy recorded during the compression strength after clamping.	
b)	Force required to obtain height of 423 mm	Shall not be less than 750 Kg.	

1.1.8 Impact Endurance Test (As per clause 5.4 of specification)

(Free fall of 1000 kg load from a height of 1 Mtrs. 500 blows)

Sample Size: 1 packs for the lot of 500 packs / 2 packs for the lot of more than 500 packs

Actual Sample:

	Endurance Test	Specified Value	
a)	Capacity when measured after half an hour	Shall not be less than 85% of the capacity recorded under clause 4.0 of spec.	
b)	Visual examination	No bond failure	

1.1.9 Compression Set (After 25% compression for 24 hrs. at 70 °C)

Sample Size: 1 pack for the lot of 500 packs / 2 packs for the lot of more than 500 packs

Actual Sample:

Parameters	Permissible Limit	1			2		
		a	b	c	a	b	c
Thickness before ageing(mm)	6.0-6.6 mm						
Spacer Thickness (mm)	4.69-4.71 mm						
Thickness after ageing (mm)							
Compression Set	30% (max.)						
Avg Compression Set							
Parameters	Permissible Limit	1			2		
		a	b	c	a	b	c
Thickness before ageing(mm)	6.0-6.6 mm						
Spacer Thickness (mm)	4.69-4.71 mm						
Thickness after ageing (mm)							
Compression Set	30% (max.)						
Avg Compression Set							

1.1.10 Specific Gravity

Sample size: 1 pack for the lot of 500 packs / 2 packs for the lot of more than 500 packs
Actual sample:

Parameters	Specified Value	1	2	3	4
Specific Gravity	Value of SG shall be maintained as mentioned in approved QAP of the firm in regular manufacture and tolerance of ± 0.05 over the SG of the prototype formulation.				

1.1.11 Ash Content

Sample size: 1 pack for the lot of 500 packs / 2 packs for the lot of more than 500 packs

Actual sample:

Parameters	Specified Value	1	2	3	4
Ash Content	5% Max				

1.1.12 Marking: As per para 8 of Spec. **OK/NOT OK**
