



QM-C-7.1/Rubber/0006
Inspection Plan(Check Sheet)

Item: Draw Gear Pads for coaching stock
Specn. : C-9501, Rev.3 of Jan'2003
Amd.:
Drg. No. & Alt.: SK-K-3004

1. Firm's Name :
2. Date (period) of inspection :
3. Contract Details :
 - (a) Contract No. & Date :
 - (b) Order placing authority :
 - (c) Specification No. :
(as mentioned in contract)
 - (d) Drawing No. :
(as mentioned in contract)
4. Quantity on Order :
5. Quantity offered for inspection on date :
6. Consignee :
Delivery period :

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Summary of Results

The sample sizes will be governed by lot size (up to 8000/above 8000Nos.)

Sl. No.	Parameters	Specified Value	Observation	
			Max.	Min.
7.1	Visual Check	Rubber shall be smooth and free from foreign materials. Pin holes, crack & trapped air blisters and other visual flaws etc. & marking.		
7.2	Dimension Check	By Go-NoGo gauge		
7.3	Physical properties before ageing			
7.3.1	Hardness	80 ± 5 Shore A		
7.3.2	Tensile Strength	Min 150 Kg/cm ²		
7.3.3	Elongation at rupture	200 % (Min.)		
7.3.4	Modulus of elasticity at 100 % Elongation	Not specified		
7.3.5	Compressive Set	30 % (Max.)		
7.3.6	Physical properties after ageing at 70 ± 1 °C for 72 + 0 / -2 Hrs.			
	Change in properties			
	Hardness	+ 5 / -0 Shore A		
	Tensile Strength	± 20 %		
	Elongation at rupture	± 30 %		
	Modulus of elasticity at 100 % Elongation	± 20 %		
7.3.7	Specific gravity	1. 22 Max.		
7.3.8	% Ash Content	5 % (Max.)		
7.4	Test on whole spring assembly			
7.4.1	Static Characteristics			
	Free height (16 spring)	448 +8/-4 mm		
	Pre compression force at 438 mm height	750 Kg < F< 2000 Kg		
	Compressive force at 423 mm height	1000 Kg < F<3000 Kg		
	Compressive force at 388 mm height	5000 Kg < F< 10000 Kg		
	Compressive force at 323 mm height	30000 Kg < F< 50000 Kg		
	Stored energy (Kgm)	>=1000 Kgm		
	Permanent set	2.5 % max.		

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7.4.2	Compression Strength after clamping	Specified		
	Free height (16 springs)	448 +8 / -4 mm		
	Pre compression force at 438 mm height	750 Kg < F< 2000 Kg		
	Compressive force at 423 mm height	1000 Kg < F< 3000 Kg		
	Compressive force at 388 mm height	5000 Kg < F< 10000 Kg		
	Compressive force at 323 mm height	30000 Kg < F< 50000 Kg		
	Stored energy	>=1000 Kgm		
	Permanent set	2.5 % max.		
7.4.3	Endurance Test			
7.4.3.1	Stored energy between of 2t to 10 t	Not less than 80 % of the corresponding stored energy recorded during the compression strength after clamping under clause 7.4.2		
7.4.3.2	Force required to obtain pack height of 423 mm	Not less than 1000 Kgs.		
7.4.3.3	After test	Elastomer should not exhibit any notches deeper than 2 mm		
7.4.4	Impact Endurance Test			
7.4.4.1	Stored energy	Not less than 85 % of the corresponding stored energy recorded under clause 7.4.1 and no sign of bond failure		
7.4.4.2	Visual Examination	No bond failure		
7.5	Metal plate examination	No sharp edges and burrs		

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7.1 Visual check

Specified sample size – Up to 8000 Nos. – 20 Pads and above 8000 nos. – 30 Pads.

Actual sample size.

Specified value Pad. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Smooth and free from cracks, pin holes, foreign materials trapped air blisters and other visual flaws.															

Specified value Pad. No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Smooth and free from cracks, pin holes, foreign materials trapped air blisters and other visual flaws.															

7.2 Dimensional check

Specified sample size – Up to 8000 Nos.- 20 packs and above 8000 nos. – 30 Pads

Actual sample size.

Specified value / Pad No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
As per Drawing															

Specified value / Pad No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
As per Drawing															

7.3 Physical properties before ageing

7.3.1 Hardness: Specified sample size – Up to 8000 Nos.- 6 pads and above 8000 Nos. – 10 Pads

(no. of measurements per pad -3)

Actual Sample size-

Parameters	Specified Value	1			2			3			4			5			
		a	b	c	a	b	c	a	b	c	a	b	c	a	b	c	
Hardness	80 ± 5 Shore A																
Mid value																	

Parameters	Specified Value	6			7			8			9			10			
		a	b	c	a	b	c	a	b	c	a	b	c	a	b	c	
Hardness	80 ± 5 Shore A																
Mid value																	

7.3.2 Tensile Strength : Specified sample size – Up to 8000 Nos.- 5 pads and above 8000 Nos. – 8 Pads

(no. of measurements per pad -3)

Actual Sample size-

Parameters	Specified Value	1			2			3			4		
		a	b	c	a	b	c	a	b	c	a	b	c
Tensile Strength	150 Kg / cm ² (Min.)												
Mid value													

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Parameters	Specified Value	5			6			7			8		
		a	b	c	a	b	c	a	b	c	a	B	c
Tensile Strength	150 Kg / Sq ² (Min.)												
Mid value													

7.3.3 Elongation at rupture: Specified sample size – Up to 8000 Nos.- 5 pads and above 8000 Nos. – 8 Pads
(no. of measurements per pad -3)

Actual Sample size-

Parameters	Specified Value	1			2			3			4		
		a	b	c	a	b	c	a	b	c	a	B	c
Elongation %	200 % (Min.)												
Mid value													

Parameters	Specified Value	5			6			7			8		
		a	b	c	a	b	c	a	b	c	a	b	c
Elongation %	200 % (Min.)												
Mid value													

7.3.4 Modulus of elasticity at 100 % Elongation:

Specified sample size – Up to 8000 Nos.- 5 pads and above 8000 Nos. – 8 Pads
(no. of measurements per pad -3)

Actual Sample size-

Parameters	Specified Value	1			2			3			4		
		a	b	c	a	b	c	a	b	c	a	b	c
100 % Modulus of elasticity (Kg/cm ²)	Not Specified												
Mid value													

Parameters	Specified Value	5			6			7			8		
		a	b	c	a	b	c	a	b	c	a	b	c
100 % Modulus of elasticity (Kg/cm ²)	Not Specified												
Mid value													

7.3.5 Compression Set:

Specified sample size – Up to 8000 Nos.- 5 pads and above 8000 Nos. – 8 Pads
(no. of measurements per pad -3)

Actual Sample size-

Parameters	Specified Value	1			2			3			4		
		a	b	c	a	b	c	a	b	c	a	B	c
Original thickness of button	6.0 – 6.6 mm												
Thickness after ageing at 70°C for 24 hrs.													
Thickness of spacers	4.69 – 4.71												
Compression set	30 % Max.												
Average value													

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Parameters	Specified Value	5			6			7			8		
		a	b	c	a	b	c	a	b	c	a	B	c
Original thickness of button	6.0 – 6.6 mm												
Thickness after ageing at 70°C for 24 hrs.													
Thickness of spacers	4.69 – 4.71												
Compression set	30 % Max.												
Average value													

7.3.6: Change in physical properties after ageing for 72 hrs. at 70°C. (no of measurements per pad-3)

Parameters	Specified Value	1			2			3			4			5		
Hardness	- 0 / + 5 Shore A															
Mid value																

Parameters	Specified Value	6			7			8			9			10		
Hardness	- 0 / + 5 Shore A															
Mid value																

Parameters	Specified Value	1			2			3			4		
Tensile Strength	± 20 %												
Mid value													

Parameters	Specified Value	5			6			7			8		
Tensile Strength	± 20 %												
Mid value													

Parameters	Specified Value	1			2			3			4		
Elongation at Break	± 30 %												
Mid value													

Parameters	Specified Value	5			6			7			8		
Elongation at Break	± 30 %												
Mid Value													

Parameters	Specified Value	1			2			3			4		
Modulus of elasticity at 100 % Elongation.	± 20 %												
Mid value													

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Parameters	Specified Value	5			6			7			8		
		a	b	c	a	b	c	a	b	c	a	b	c
Modulus of elasticity at 100 % Elongation.	± 20 %												
Mid value													

7.3.7 Specific Gravity: Specified Sample Size – Up to 8000 nos. -3 Pads and above 8000 nos. -5 Pads
Actual Sample Size -

Parameters	Specified Value	1	2	3	4	5
Specific Gravity:	1.22 Max.					

7.3.8 Ash Content : Specified Sample Size – Up to 8000 nos. -3 Pads and above 8000 nos. -5 Pads
Actual Sample Size -

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

7.4 Test on whole spring assembly – (Graph are required to be plotted)

7.4.1 Static Characteristics: Specified sample size –up to 8000 nos. –1 pack (16 Nos.).above 8000 nos.– 2 packs (32 nos.)
Actual sample size.

Static Characteristics	Specified Value	1	2
Free height (16 spring)	448 +8/-4 mm		
Pre compression force at 438 mm height	750 Kg < F< 2000 Kg		
Compressive force at 423 mm height	1000 Kg < F< 3000 Kg		
Compressive force at 388 mm height	5000 Kg < F< 10000 Kg		
Compressive force at 323 mm height	30000 Kg < F< 50000 Kg		
Stored energy	>=1000 Kgm		
Permanent set	2.5 % max.		

7.4.2 Compressive strength after clamping for 72 hrs. at 423 ± 2 mm

Specified sample size –up to 8000 nos. –1 pack (16 Nos.).above 8000 nos.– 2 packs (32 nos.)

Actual sample size.

Comp. strength after clamping	Specified Value	1	2
Free height (16 spring)	448 +8 / -4± 4 mm		
Pre compressive force at 438 mm height	750 Kg < F< 2000 Kg		
Compressive force at 423 mm height	1000 Kg < F< 3000 Kg		
Compressive force at 388 mm height	5000 Kg < F< 10000 Kg		
Compressive force at 323 mm height	30000 Kg < F< 50000 Kg		
Stored energy	>=1000 Kgm		
Permanent set	2.5 % max.		

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7.4.3 Endurance test : Specified sample size –up to 8000 nos. –1 pack (16 Nos.).above 8000 nos.– 2 packs (32 nos.)
Actual sample size.

7.4.3	Endurance test	Specified value	1	2
7.4.3.1	Stored energy between 2t to 10t	80 % of the corresponding stored energy recorded during the compression strength after clamping under clause 7.4.2		
7.4.3.2	Force required to obtain pack height of 423 mm	Not less than 1000 Kgs.		
7.4.3.3	After test	Elastomer should not show any notches deeper than 2 mm		

7.4.4 Impact Endurance Test :

Specified sample size –up to 8000 nos. –1 pack (16 Nos.).above 8000 nos.– 2 packs (32 nos.)
Actual sample size.

7.4.4	Impact Endurance test	Specified value	1	2
7.4.4.1	Stored energy	85 % of the corresponding stored energy recorded under clause 7.4.1		
7.4.4.2	Visual examination	No bond failure		

7.5 Metal plate examination :

Specified sample size –up to 8000 nos. –5 Pads .above 8000 nos.–5 Pads.
Actual sample size.

Parameters	Specified Value	1	2	3	4	5
Metal Plate	No Sharp edges & Burrs					

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