KES

Cellular Substances for Automobiles

KES B-Q001

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1. Purpose

This standard aims at securing proper quality by standardizing the performance of cellular substances used for the automobile.

2. Scope of Application

This standard specifies cellular substances used for sound abosorption, heat insulation, sound-proofing, dust-proofing and cushions in the automobile body.

3. Kinds

The cellular substances is largely classified into 2 kinds: soft cellular substances and hard cellular substances. And, again, soft cellular substances are classified into 5 kinds, and hard cellular substances are classified into 2 kinds-as indicated in Table 1 according to apparent density, hardness, compression strength and foaming method.

4. Meaning of Terminology

(1) Soft cellular substances

It has some deformation properties, it undergoes deformation under a load and readily returns to its orginal shape with the removal of the load. Moreover, it generally includes what is called semi-hard cellular substances.

(2) Rigid cellular substances

This indicates the cellular substances which undergoes much deformation under a small load has a low elasticity limit, and does not return to its original shape beyond a certain amount of deformation.

Table 1. Classification of soft and rigid cellular substances

Types			Apparent density	Hardness	Compression hardness	Compression strength	Foaming methods
Classification	Part name	By type	g/cm³	N (kgf)	N/cm² (kgf/cm²)	N/cm² (kgf/cm²)	
Soft cellular substances	Ether group soft urethane foam	Type 1	10.018	93(9.5)			
		Type 2	0.020	113(11.5)			
		Type 3	0.022	98(10.0)			
		Type 4	0.022	127(13.0)			
		Type 5	0.025	118(12.0)			
		Type 6	0.033	127(13.0)			
		Type 7	0.040	137(14.0)			
		Type 8	0.045	147(15.0)			
		Type 9	0.050	294(30.0)			

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Kind			Apparent density	Hardness	Compression hardness N/cm² (kgf/cm²)	Compression strength N/cm² (kgf/cm²)	Foaming methods
Classification	Part name	By type	g/cm³	N (kg f)			
	Ether group high elastic urethane foam	Type 1	0.040	137(14.0)			
		Type 2	0.045	157(16.0)			
		Type 3	0.050	186(19.0)			
	Esther group soft urethane foam	Type 1	0.028	137(14.0)			
		Type 2	0.028	176(18.0)			
		Type 3	0.030	127(13.0)			
	Foam rubber	Type 1	0.100	69(7.0)			
		Type 2	0.120	103(10.5)			
	Polyethylene foam	Type 1	0.025		2.0(0.20)		
		Type 2	0.035		2.5(0.25)		
		Type 3	0.050		3.0(0.3)		
		Type 4	0.065		4.5(0.45)		
		Type 5	0.095		6.9(0.70)		
Rigid cellular substances	Rigid urethane foam	Type 1	0.030			6.9(0.7)or more	Freon foaming
		Type 2	0.035			6.9(0.7)or more	CO_2 foaming
		Type 3	0.045			19.7(2.0)or more	Freon foaming
		Type 4	0.045			21.6(2.2)or more	CO_2 foaming
		Type 5	0.060			32.4(3.3)or more	Freon foaming
	Polystyrene foam	Type 1	0.020			14 (1.4)or more	
		Type 2	0.025			19 (1.9)or more	
		Type 3	0.030			24 (2.4)or more	
		Type 4	0.035			29 (2.9)or more	

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