1992. 1.15

KES

Spring Lock Washer

KES E-C002

(EST.) 1991-12-10

Contents

KIA MOTORS

1. Scope of Application

This KES Standard covers spring washers intended for preventing the backing off of bolts and machine screws for automotive applications (hereinafter called the washer).

2. Hardness

Washer hardness shall be a Rockwell hardness of C42~50.

3. Spring Function

When spring function is tested in accordance with the provision of 9.2, free, height after testing shall satisfy the values listed in the Attached Table.

4. Toughness

Toughness of the washer shall, when tested in accordance with the provision of 9.3, be such that damage does not occur at a twisting angle of up to 90 deg.

5. Shape and Dimensions

Washer shape and dimensions shall conform to the Attached Table.

6. Appearance

The washer surface shall be smooth without cracks, and free from flaws, roughness, and sharp corners that might affect serviceability.

Also, the severed ends of washer shall be free from excessive burrs.

7. Material

The washer shall be made from SWRH57~SWRH77 specified in *1 KS D 3559 (Hard steel wire materials).

If the manufacturer and purchaser agree, leadpatentiong materials may be used, in which case a minimum hardness shall be a Rockwell hardness of C42.

*1 JIS G 3506

8. Surface Treatment

The washer surface shall, as a rule, be phosphated, and after this processing, shall be coated with rust inhibitor oil.

When bright chromating process is designated after electric zin plating, the following quality shall be secured:

Plating thickness	Not less than 2 μm
Rust protection	After 48 h of salt spray testing per JIS Z 2371, the washer shall not exhibit rust.
Removal of embrittlement	No damage due to hydrogen embrittlement shall be evident.

9. Test Method

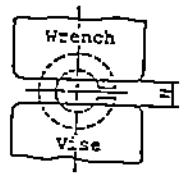
9.1 Hardness test : Washer hardness shall be tested in accordance with *1 KS B 0806 (Method of Rockwell and Rockwell superficial hardness test) or a equivalent method.
By the way the surface shall be ground lightly for measurement.

9.2 Compression test : After test load shown in the Attached Table is applied three consecutive times, washer free height shall be measured.

9.3 Twist test : The washer shall be gripped in the vise jaws and wrench jaws, as shown in the Figure below, and the wrench shall be moved in a direction that increases the height of the washer. Edges of the vise jaws and wrench jaws shall not be excessively rounded.
Distance H between the vise and wrench shall be as shown in the table.

*1 JIS Z 2245

Figure



Table

Unit: mm

Nominal dia.	H	Nominal dia.	H
3	1.5	14	7
4	2	16	8
5	2.5	18	9
6	3.5	20	10
6.2		22	11
8	4	24	12
10	5	27	14
12	6	-	-

10. Inspection

The washer shall be inspected to see that the requirements specified in aforementioned items 2 through 9 be met.

11. Specification Changes

Washer specifications may be changed only by revising this standard.

Revision of this standard shall be carried out by following the prescribed procedure in accordance with the KMS Proposal System.

12. Part Name

Name of the washer shall be WASHER-SPRING.

13. Structure of Part Number

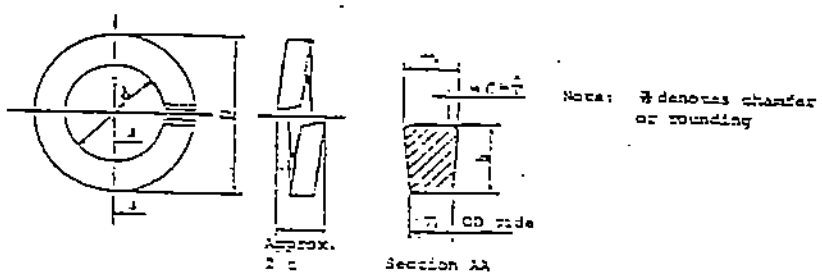
Part number of the washer shall consist of type number and size number.

For example:

Washer	Nominal dia. 6
99971	0600
(Type number)	(Size number)

Attached Table Shape and dimensions of spring washer

(Type No. 99971)



Size No.	Nom. dia.	d		b (Min.)	t(1) (Min.)	D (Max.)	Free ht. after compress (Min.)	Test load kgf {kN}	Mass (g)
		Basic dim.	Tol.						
0300	3	3.1	+0.3 0	1.1	0.7	5.9	1.2	105 {1.03}	0.1
0400	4	4.1	+0.4 0	1.4	1.0	7.6	1.7	180 {1.77}	0.2
0500	5	5.1		1.7	1.3	9.2	2.2	300 {2.94}	0.4
0600	6	6.1		2.7	1.5	12.3	2.5	420 {4.12}	0.9
※ 0601	6.2	6.3							
0800	8	8.2	+0.5 0	3.2	2.0	15.4	3.35	760 {7.45}	1.8
1000	10	10.2	+0.3 0	3.7	2.5	18.2	4.2	1200 {11.77}	3.2
1200	12	12.2	+0.6 0	4.2	3.0	21.5	5	1800 {17.65}	4.4
1400	14	14.2		4.7	3.5	24.5	5.85	2400 {23.54}	8.0
1600	16	16.2	+0.8 0	5.2	4.0	28	6.7	3300 {32.36}	11.1
(1800)	18	18.2		5.7	4.6	31	7.7	4000 {39.23}	15.6
(2000)	20	20.2		6.1	5.1	33.8	8.5	5000 {49.03}	20.9
2200	22	22.2	+1.0 0	6.8	5.6	37.7	9.35	6300 {61.78}	27.8
2400	24	24.2		7.1	5.9	40.3	9.85	7300 {71.59}	33.7
(2700)	27	27.5	+1.2 0	7.9	6.8	45.3	11.3	9500 {93.16}	47.1

Note (1)

$$t = \frac{T1+T2}{2}$$

Remarks 1. This standard is based on *1 KS B 1324 (Spmg Washer) Specification No. 2.

2. The washer with the size number marked ※ is for use with the reamer bolt. Before shipping for delivery, this particular washer shall be marked for identification to avoid mixing with the washer of nominal size 6.

3. The washers with size number enclosed in ( ) have never been used and must be excluded from application if possible.

*1 JIS B 1251

Reference : The gap and angles of the severed ends must be such as to prevent stacking in full compression and ensure that two or more washers be not connected in the manner of chain. However, when the gap dimension has to be agreed upon, reference to the following Table is recommended.

Unit:mm

Nominal dia.	3	4	5	6	8~12	14	16~27
Severed ends gap (Max.)	0.5		0.8		1.2	1.6	2

Quoted standards

Refer to the latest editions.

KS B 1324 Spring washer

KS D 3559 Hard steel wire material

KS B 0806 Method of Rockwell and Rockwell superficial hardness test

KS D 9502 Salt spray test method