KES

Welding Quality of Weld Bolts

KES C-G004

(EST.) 1989 - 07 - 10

Contents

KIA MOTORS

5. Welding Quality

The weld bolt shall be free from deformation or dust and shall satisfy either welding quality mentioned in 5.1 or 5.2.

5.1 Forced load resistance: When the forced load in Table 3 is applied to the bolt according to item 6, no separation nor crack on the weld zone shall occur. The bolt and weld-pin of 99790, which are welded all around, may satisfy at least the load indication in Table 3.

Table 3

Unit: kgf {N}

Bolt Size / Mating Steel Plate Thickness mm	M 5	M 6	M 8	M 10
0.6, 0.7	250{2452}	300{2942}	350 {3432}	350 {3432}
0.8	300{2942}	350{3432}	450 {4413}	600 {5884}
1.0	340{3334}	420{4119}	500 {4903}	750 {7355}
1.2	370{3628}	480{4707}	580 {5687}	800 {7845}
1.6	430{4217}	550{5394}	690 {6766}	940 {9218}
2.0	500{4903}	600{5884}	800 {7845}	1020{10002}
2.3	550{5393}	630{6178}	900 {8825}	1130{11081}
3.2	650{6374}	780{7649}	1080{10590}	1500{14709}
4.0	720{7060}	850{8335}	1310{12846}	1630{15984}
5.0	800{7845}	950{9316}	1450{14219}	2120{20789}
6.0	860{8433}	1000{9806}	1550{15199}	2420{23731}

Remark: When the mating steel plate thickness is in the middle of the thickness indicated in Table 3, the forced load of the thicker plate shall be applied.

1. Scope of Application

This standard specifies the welding quality of weld bolt and weld-pin for automobiles (hereinafter referred to as the "bolt").

This bolt shall be used when its head on the side of bearing surface is projection-welded. When its head on the side of top face is welded, this bolt shall not be used.

2. Purpose

This standard aims at standardizing the welding quality of bolt to secure proper quality of weld bolt.

3. Kind of Steel Plates

The kind of steel plates on which the bolt is welded shall conform to Table 1.

Table 1

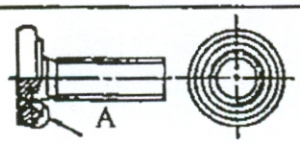
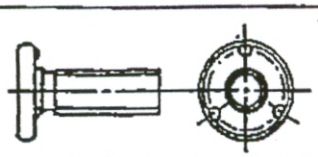
Kind of Steel Plates	Pertinent Material Symbol
Cold-rolled steel plate	SPC1, etc.
Hot-rolled steel plate	SPHC, etc.
Rolled steel plate for welding structure	SM5OB, etc.
Hot-rolled steel plate for automobile and structure	SAPH32, etc.
Cold-rolled high tension steel plate	HPC35, etc.

Remark: The above steel plates on which the surface treatment such as zinc plating has been performed are also applied.

4. Kind of Bolts

The bolt has two kinds indicated in Table 2.

Table 2

Kind Welding Projection	Sketch of Configuration	Bolt * Weld-pin
Class 1 Cone point · all around		99790
Class 2 Hemisphere · 3 spots		99240 99241 99791

* This shall include the bolt which has been setting up as an exclusive part.

5.2 Nugget: The size of nugget shall satisfy the size in Table 4.

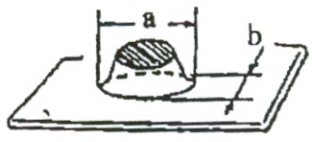
Table 4

Unit mm

Bolt Size / Mating Steel Plate Thickness	M5			M6			M8			M10		
	Nugget Diameter	Nugget Height	Base Metal Material Rupture	Nugget Diameter	Nugget Height	Base Metal Material Rupture	Nugget Diameter	Nugget Height	Base Metal Material Rupture	Nugget Diameter	Nugget Height	Base Metall Material Rupture
0.6, 0.7	2.0	—	2 spots or more	2.5	—	2 spots or more	3.0	—	2 spots or more	3.5	—	2 spots or more
0.8	2.0	—	2 spots or more	2.5	—	2 spots or more	3.0	—	2 spots or more	3.5	—	2 spots or more
1.0	2.0	—	1 spots or more	2.5	—	2 spots or more	3.0	—	2 spots or more	3.5	—	2 spots or more
1.2	2.0	—	1 spots or more	2.5	—	1 spots or more	3.0	—	1 spot or more	3.5	—	1 spot or more
1.6	2.0	0.3	—	2.5	0.3	—	3.0	0.3	—	3.5	0.3	—
2.0	2.0	0.3	—	2.5	0.3	—	3.0	0.3	—	3.5	0.3	—
2.3	2.0	0.3	—	2.5	0.3	—	3.0	0.3	—	3.5	0.3	—
3.2	2.0	0.3	—	2.5	0.3	—	3.5	0.4	—	4.0	0.4	—
4.0	2.5	0.3	—	3.0	0.3	—	3.5	0.4	—	4.0	0.4	—
5.0	2.5	0.3	—	3.0	0.3	—	3.5	0.4	—	4.0	0.4	—
6.0	2.5	0.3	—	3.0	0.3	—	3.5	0.4	—	4.0	0.4	—

Remark 1. The nugget diameter shall be calculated according to the following formula.

$$D = \frac{a + b}{2}$$



Where, D : Nugget diameter per 1 welding spot

a, b : As shown in the above figure

2. The above nugget diameter means the size when a hole in the mating steel plate is caused by the fracture test. When the mating steel plate thickness is 1.4 mm or more, the specified nugget diameter and height shall be satisfied.
3. Nugget height means the smallest value in 3 spots, as shown in the following figure.

h: Nugget height

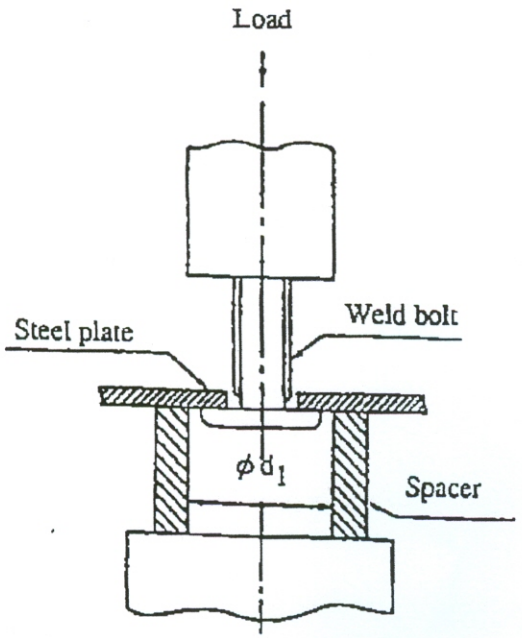
4. Base metal rupture means that a hole in the base metal is caused by the fracture test.
5. When the mating steel plate thickness is in the middle of the thickness indicated in Table 4, the nugget of the thicker plate shall be applied.
6. The nugget diameter shall not apply to the bolt weld-pin of 99790.

5.3 Sealability: Weld bolt of 99790 shall satisfy the all-round sealability (The bolt is welded all around.).

6. Test Method

The test method for forced load resistance of bolt conform to the followings. After placing the steel plate, on which the bolt was welded, on a spacer as shown in Fig. 1, apply a load in Table 3 so that the center of load corresponds with the central axis of thread. Check the presence of separation and crack on the weld zone by visual inspection.

Fig. 1

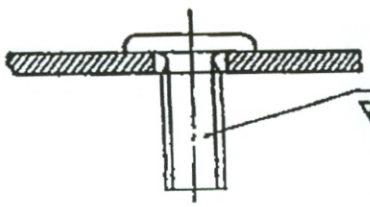


Designation of Thread	d_1 (mm)
M4 x 0.7	14
M5 x 0.8	16
M6 x 1	18
M8 x 1.25	22
M10 x 1.25	26

7. Indication on the Drawing

When the quality ranking of welding quality of bolt is indicated on the drawing, conform to the example as shown in Fig. 2 or indicate the quality rank into the specification column in a drawing.

Fig. 2



8. Alteration of Specification

The specifications of welding quality of bolt may be altered only after the revision of drawings or this standard. This standard is revised following the specified proceedings and according to the KES Proposal System.

9. Quoted Standard

Nothing