KES

Welding Quality of Weld Nuts

KES C-G003

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KIA MOTORS

حوزه، وسعت

1. Scope of Application

This standard specifies the welding quality of weld nuts used for automobiles. (Hereinafter referred to as the "nuts").

منظور، هدف

2. Purpose

This standard aims at standardizing the welding quality of nuts in order to secure a proper quality of nuts after welding.

3. Kind of Steel Plates

The kind of steel plates on which nuts are welded shall be as shown in Table 1.

Table 1

Kind of Steel Plates	Pertinent Material Symbol
Coldrolled steel plates	SPC1 (KES B-A002), etc.
Hotrolled mild steel plates	SPHC (KES B-A013), etc.
Rolled steel plates for welded structures	SM50 (KES B-A013), etc.
Hotrolled steel plates for automobile structures	SAPH32 (KES B-A013), etc.
Coldrolled high-tension steel plates	TSPFC35 (KES B-A007), etc.

Remark: The above-mentioned steel plates also include those with surface treatment such as zinc-plating and the like.

4. Kind of Nuts

Nuts are classified according to the shape, the presence of pilots and the welding method, as shown Table 2.

Table 2

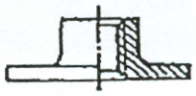
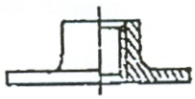
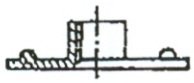
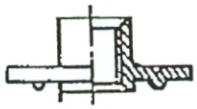
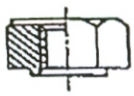
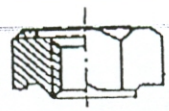
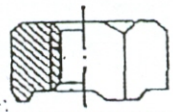
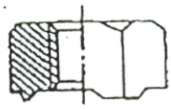
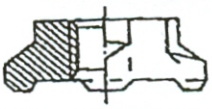
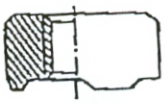
Kind			Outlined Shape	Example of Nut *
Shape	Pilot	Welding method		
Type T	No	Spot welding (SW)		99994 (Wide)
				99914
		Projection welding (PW)		99995 (Wide)
				99918
				99915
	Yes			99998
Hexagon	Yes	Arc welding (EW)		99919
		Projection welding (PW)		99917
	No			99916
				99993 (For sealing)

Table 2 (Continued)

Kind			Outlined Shape	Example of Nut
Shape	Pilot	Welding method		
Square				99996
Round	No	Projection welding (PW)		H260 53 972

* Including nuts designated as exclusive parts.

5. Welding Quality

After welding, the nuts shall have no deformation affecting their use and no adhesion of dust on them, and shall satisfy the following welding quality.

5.1 Shapes of nuts and welding quality: For each shape of nuts, the welding quality to be evaluated shall be as shown in Table 3.

Table 3

Shape	Welding Quality
Type T	5.2 (1) Pushing-load resistance, or 5.3 Nugget diameter
Round	5.2 (2) Pushing-load resistance
Hexagon, square	5.4 Torsional-load resistance
For sealing (hexagon)	5.4 Torsional-load resistance, and 5.5 Sealability

5.2 Pushing-load resistance: When the pushing-load shown in Table 4 and Table 5 is applied according to 6.1, no separation or crack shall occur on the welded parts of the nuts. For the mating steel plate whose thickness is not specified in this standard, the values of the approximate thick plate shall be applied. For combinations of thick and thin mating plates, similarly the values of the thicker plate shall be applied.

(1) Type T nuts

Table 4

Unit: kgf {N}

Thickness of Mating Steel Plate mm \ Nut Size	M 5	M 6	M 8
0.6, 0.7	Over 350 {3432}	Over 370 {3628}	←
0.8	Over 390 {3825}	Over 430 {4217}	←
1.0	Over 480 {4707}	Over 500 {4903}	←
1.2	Over 480 {4707}	Over 500 {4903}	←
1.6	Over 480 {4707}	Over 500 {4903}	Over 700 {6865}
2.0	Over 480 {4707}	Over 500 {4903}	Over 700 {6865}
2.3	Over 480 {4707}	Over 500 {4903}	Over 700 {6865}
3.2	Over 480 {4707}	Over 500 {4903}	Over 700 {6865}
4.0	Over 480 {4707}	Over 500 {4903}	Over 700 {6865}
5.0	Over 480 {4907}	Over 500 {4903}	Over 700 {6865}
6.0	Over 480 {4907}	Over 500 {4903}	Over 700 {6865}

(2) Round nuts

Table 5

Unit: kgf {N}

Thickness of Mating Steel Plate mm \ Nut Size	M 10	M 12
1.4	Over 800 {7846}	Over 1000 {9808}
1.6	Over 800 {7846}	Over 1000 {9808}
2.0	Over 800 {7846}	Over 1000 {9808}
2.3	Over 800 {7846}	Over 1000 {9808}
3.2	Over 800 {7846}	Over 1000 {9808}

5.3 Nugget diameter: The nugget diameter shall satisfy the values shown in Table 6. For the mating steel plate whose thickness is not specified in this standard, the values of the approximate thick plate shall be applied. For combinations of thick and thin mating plates, similarly the values of the thicker plate shall be applied.

5.3 - قطر کمه جوش جدا شده باید مطابق با جدول 6 باشد. در مواردی که ضخامت ورق مورد استفاده در این استاندارد ذکر نشده است، نزدیکترین ضخامت مشابه را در نظر 4/8 بگیریم. در مورد ترکیب ورق های نازک و ضخیم باید اعداد شده برای ورق ضخیم تر در نظر بگیریم.

Table 6

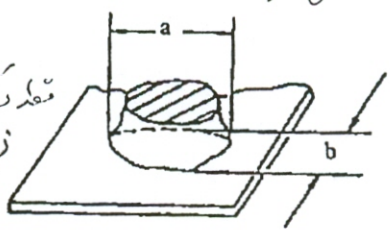
Unit: mm

Thickness of Mating Steel Plate \ Nut Size	M5	M6	M8
	Nugget diameter	Nugget diameter	Nugget diameter
0.6, 0.7	Over 2.0	Over 2.0	Over 2.0
0.8	Over 2.0	Over 2.0	Over 2.0
1.0	Over 2.0	Over 2.0	Over 2.0
1.2	Over 2.0	Over 2.0	Over 2.0
1.6	Over 2.5	Over 2.5	Over 2.5
2.0	Over 2.5	Over 2.5	Over 2.5
2.3	Over 2.5	Over 2.5	Over 3.0
3.2 *	Over 3.0	Over 3.0	Over 3.5
4.0 *	Over 3.0	Over 3.5	Over 3.5
5.0 *	Over 3.5	Over 3.5	Over 4.0
6.0 *	Over 3.5	Over 4.0	Over 4.0

* In case of projection welding, it is enough to secure a nugget diameter of 3 mm or more.

Remark 1: The nugget diameters mentioned above shall be calculated by the following formula:

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

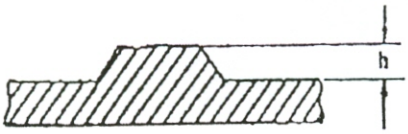


Where, D: Nugget diameter at 1 point of welding

a, b : As shown in the figure

Remark 2: The nugget diameters mentioned above refer to those where a hole is caused on the mating steel plate or nut flange side in destruction test.

However, when the thickness of the mating steel plate is 1.4 mm or more, it is enough to form molten metal of 25% or more of the plate thickness.



h; 25% or more of plate thickness

5.4 Torsion load resistance: When the torsion load shown in Table 7 is applied according to 6.2, no separation or crack shall occur on the welded parts of the nuts. For the mating steel plate whose thickness is not specified in this standard, the values of the approximate thick plate shall be applied. For combinations of thick and thin mating plates, similarly the values of the thicker plate shall be applied.

5.4 بارگذاری پیچشی، در بارگذاری پیچشی مطابق جدول 7 عمل می کنیم طبق روش 6.2 و هیچگونه جدایش و یا ترک نباید در قطعات جوشی و یا مهره ایجاد گردد. برای ورق های ضخامت استاندارد انتظار، جدول فوق ذکر نشده است لذا گرد کردن، ضخامت با مقادیر ذکر شده برای نزدیکترین ضخامت بالاتر استفاده می کنیم.

Table 7

Unit: kgf · cm {N · cm}

Nut Size / Thickness of Mating Steel Plate mm	M4,5	M6	M8	M10	M12
0.6, 0.7	Over 250 {2452}	Over 300 {2942}	Over 400 {3923}	Over 550 {5394}	—
0.8	Over 300 {2942}	Over 400 {3923}	Over 500 {4903}	Over 650 {6374}	Over 700 {6865}
1.0	Over 300 {2942}	Over 450 {4413}	Over 550 {5394}	Over 700 {6865}	Over 800 {7845}
1.2	Over 400 {3923}	Over 500 {4903}	Over 600 {5884}	Over 850 {8336}	Over 950 {9316}
1.6	Over 400 {3923}	Over 550 {5394}	Over 700 {6865}	Over 900 {8826}	Over 1050 {10787}
2.0	Over 400 {3923}	Over 550 {5394}	Over 750 {7355}	Over 1000 {9807}	Over 1150 {11278}
2.3	Over 400 {3923}	Over 550 {5394}	Over 750 {7355}	Over 1100 {10787}	Over 1300 {12749}
3.2	Over 400 {3923}	Over 550 {5394}	Over 750 {7355}	Over 1100 {10787}	Over 1450 {14220}
4.0	Over 400} {3923}	Over 550 {5394}	Over 750 {7355}	Over 1100 {10787}	Over 1450 {14220}
5.0	—	Over 550 {5394}	Over 750 {7355}	Over 1100 {10787}	Over 1450 {14220}
6.0	—	—	Over 750 {7355}	Over 1100 {10787}	Over 1450 {14220}

برای ترکیبی از ورق های نازک و ضخیم، مقادیر ذکر شده برای ورق ضخیم تر را در نظر می گیریم.

مناسب due، طبق برنامه، مطابق انتظار idling

Remark: When the square nut can not be measured due to idling of the load measuring device, the judgement of test success shall be made by the inspection section.

تشخیص

در مواردی که مهره های چهارگوش را نتوان اندازه گیری کرد، 6/8 به علت ناتوانی تجهیزات اندازه گیری بار، تشخیص تست موفق بوسیله قسمت بازرسی تعیین شود.

آب بندی

5.5 Sealability: When the test of 6.3 is carried out, no air shall leak out at the welded parts.

هنگام تست 6.3 هیچگونه هوایی نباید در قطعات جوشی نشت کند.

6. Testing Method

The testing methods of pushing-load resistance and torsional-load resistance of nuts shall be as follows:

6.1 Pushing-load resistance: As shown in Fig. 1, mount a steel plate on which a nut is welded on a spacer, and align the load center to the center axis of the screw.

After applying the load shown in Table 4 and Table 5, examine the occurrence of separation and cracks on the welded part visually.

mount: قرار دادن

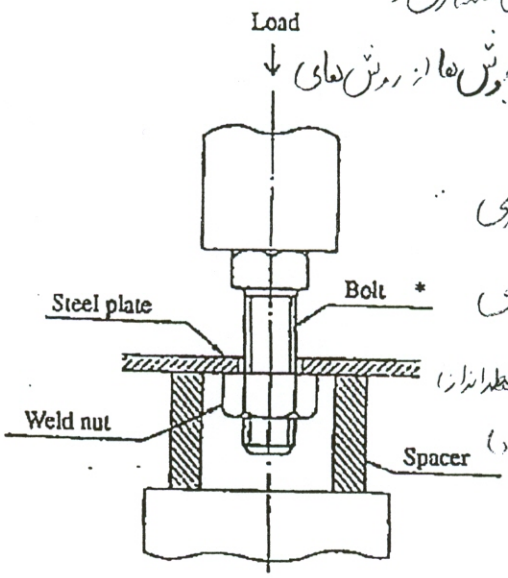
spacer: فاصله انداز

screw: پیچ

6. روش های تست: رخ دادن پیش آمدن

روش های تست مقاومت در برابر بارگذاری فشاری و مقاومت در برابر بارگذاری پیچشی مهره جوش ها از روش های زیر باید پیروی کرد.

Fig. 1



6.1: مقاومت در برابر بارگذاری فشاری

مطابق شکل 1 ورق را که مهره جوش روی آن جوش داده شده است روی یک فاصله انداز (مطابق شکل که مهره در فضای آزاد قرار گیرد) قرار می دهیم و محل بارگذاری را به مرکز محور پیچ میزان می کنیم.

پس از استفاده از بارهای ذکر شده در جدول 4 و جدول 5 تست چشمی صورت می گیرد که آیا جدایش و یا ترک در قطعات جوشی رخ داده است یا خیر.

* The bolts to be used for the test shall satisfy the following conditions;

پیچ مورد استفاده باید دارای خصوصیات ذیل باشد

Finishing degree : Fine in JIS B 1180 (Hexagon Headed Bolts) درجه اتمام، مطابق استاندارد ـــــــ (پیچ سر شش گوش)

Grade of thread : 6 g or class 2 رتبه دقت پیچ

Strength division: 8.8 or higher قدرت جداشدن

6.2 Torsional-load resistance: As shown in Fig. 2, fix a steel plate on which a nut is welded. After applying the moment shown in Table 6 on a plane as vertical as practicable to the center axis of the screw, examine the occurrence of separation and cracks on the welded part visually.

مقاومت در برابر بارگذاری پیچشی، مطابق شکل نشان داده شده ورق فولادی که مهره جوش روی آن جوش داده شده است پس به کار بردن مقادیر ذکر شده در جدول 6 در نقشه به صورت عمود بر محور پیچ اعمال می شود. باید تست شود که ترک یا جدایش در قطعه جوش ایجاد شده باشد.

5.5 Sealability: When the test of 6.3 is carried out, no air shall leak out at the welded parts.

6. Testing Method

The testing methods of pushing-load resistance and torsional-load resistance of nuts shall be as

6.1 Pushing-load resistance: As shown in Fig. 1, mount a steel plate on which a nut is we spacer, and align the load center to the center axis of the screw.

After applying the load shown in Table 4 and Table 5, examine the occurrence of separ cracks on the welded part visually.

Fig. 1

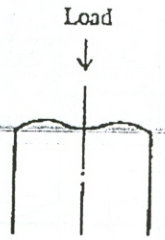
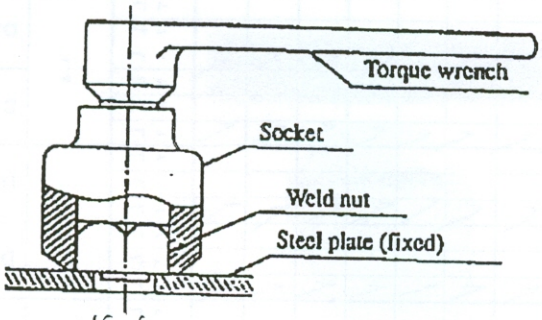


Fig. 2



غیرقابل تعویض
محفوظ از هوا
هرامن

محکم چسباندن
مدرموم

آب بندی

Sealability: Test the airtightness at the seal parts of seal nuts as shown in Fig. 3. Apply an air pressure of 0.2 kgf/cm^2 {19.6 kPa} for 5 seconds, and apply some soap water or the like to check for air leaks.

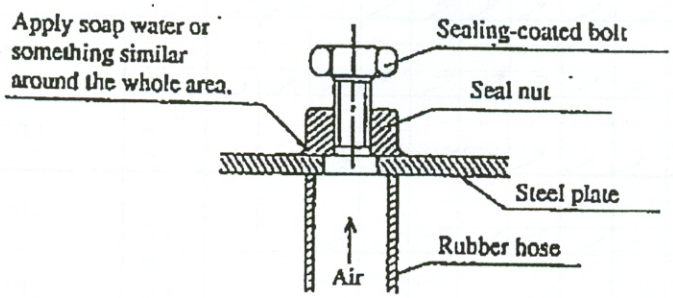



Fig.3