

KES

Steering Wheel

KES D-B203

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Contents

1. Purpose
2. Scope of Application
3. Report Evaluation Results
4. Definition of Terminology
5. Specification Indicated in Drawings
6. Evaluation Standard
7. Evaluation Method
8. Alteration of Specification
9. Indication Method on Drawings
10. Quoted Standard

Appendix



1. Purpose

This standard aims at securing proper quality by standardizing specifications.

Remark: This standard and a drawing communicate together our requirements.

2. Scope of Application

This standard specifies the steering wheel for automobiles.

3. Report of Evaluation Result

The quality evaluation results at each stage from development to mass production shall be submitted either to KIA or MMUC according to the Appendix.

4. Definition of Terminology

Minimum acceptable sample: A sample manufactured specially for items that make absolute evaluation impossible on inspection, in order to provide relative evaluation to products to be evaluated.

Minimum acceptable sample shall be approved by the Engineering and Inspection Department.

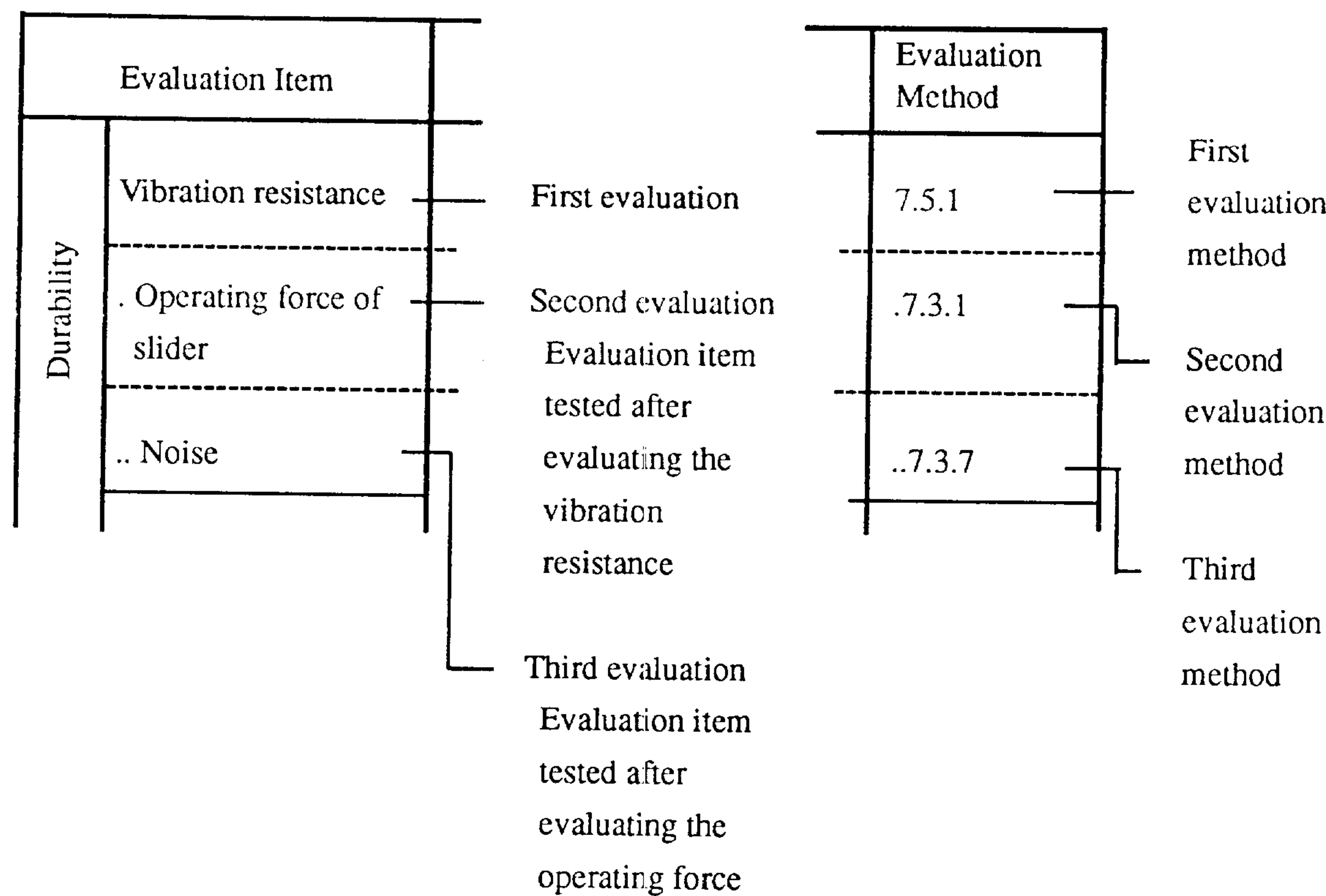
5. Specifications Indicated in Drawings

- (1) Apparent designing (Shape, material, grain, hardness, color)
- (2) Horn relay: With or without
- (3) Target inertia moment
- (4) Target weight
- (5) Installing angle of steering shaft: θ_1 , and θ_2
- (6) Standard values in this standard that are subject to change

6. Evaluation Standard

The evaluation standard of the steering wheel shall conform to Table 1.

Remark 1. The way of reading evaluation items and methods in Table 1 shall conform to the following example.



Remark 2. The quality rank shall be represented by A, AR, B or C.
The definitions shall conform to KES Q-A002 (Determination and Procedure of Quality Ranking).

Table 1

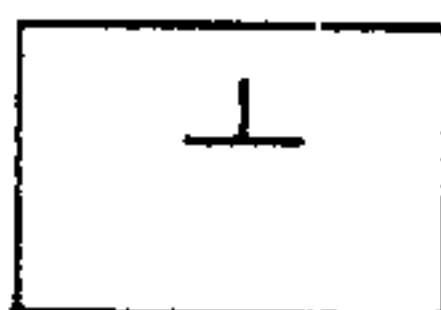
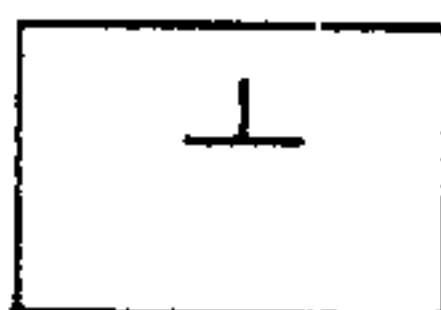
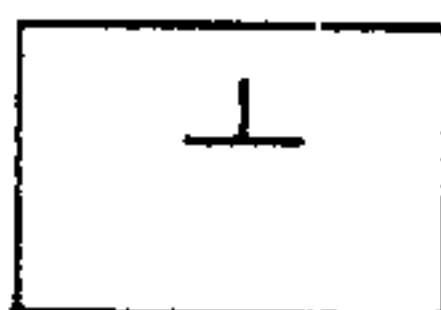
Evaluation Item		Evaluation Standard	Quality Rank	Evaluation Method												
Appearance quality	Irregular color Irregular grain Flashing Flow mark Weld Stagnant air	According to a minimum acceptable sample.	C	Visual inspection												
	Pinhole Shrinkage Burrs Slivers Corner Flaw	According to a minimum acceptable sample.	C	Visual and touch inspection												
Apparent dimensions . tolerances	Apparent shape tolerances (1) Peripheral runout (a) (2) Peripheral fluctuations (b) (3) Concentricity of column cover grooves (C & D) (4) Runout of core cover surface (E surface) (5) Squareness of contact plate surface (F surface)	(1) <table border="1"><tr><td></td><td>6.0</td><td>A</td></tr></table> (2) <table border="1"><tr><td></td><td>5.0</td><td>A</td></tr></table> (3) <table border="1"><tr><td></td><td>0.5</td><td>A</td></tr></table> (4) + 1.0 - 0.5 (5) <table border="1"><tr><td></td><td>0.5</td><td>A</td></tr></table>		6.0	A		5.0	A		0.5	A		0.5	A	C	7.2.1
		6.0	A													
	5.0	A														
	0.5	A														
	0.5	A														
Clearance tolerances and parallelism (1) Clearance tolerances	a = Standard value ± 0.5 mm b = Standard value ± 0.5 mm c = Standard value ± 0.5 mm d = When the horn is operated: Standard value ± 1.0 mm when a fixing cap is installed: 0 to 0.5 mm e = Standard value ± 0.5 mm f = Standard value ± 0.5 mm	C	7.2.2													

Table 1 (Continued)

Evaluation Item		Evaluation Standard		Quality Rank	Evaluation Method								
Apparent dimensions . tolerances	(2) Clearance parallelism	<table><tr><td>Respective L value</td><td>Acceptable parallelism of a through f</td></tr><tr><td>30 mm or less</td><td>0.3 mm or less</td></tr><tr><td>30 to 100 mm</td><td>0.5 mm or less</td></tr><tr><td>100 mm or over</td><td>0.8 or less</td></tr></table>		Respective L value	Acceptable parallelism of a through f	30 mm or less	0.3 mm or less	30 to 100 mm	0.5 mm or less	100 mm or over	0.8 or less	C	7.2.2
	Respective L value	Acceptable parallelism of a through f											
30 mm or less	0.3 mm or less												
30 to 100 mm	0.5 mm or less												
100 mm or over	0.8 or less												
	Step tolerance	<table><tr><td>Pad, Horn cap</td><td>± 1 mm</td></tr><tr><td>Horn button, ornament</td><td>± 0.5 mm</td></tr></table>		Pad, Horn cap	± 1 mm	Horn button, ornament	± 0.5 mm	C	7.2.3				
Pad, Horn cap	± 1 mm												
Horn button, ornament	± 0.5 mm												
Inside appearance	Appearance of built-in items	For visible built-in items in the vehicle condition like horn structure, either paint them in conspicuous color (For example, black) or hide them by protectors.		C	Visual inspection in all directions								
	Light leak on horn contact point	The leakage shall be within the extent that is invisible by the passengers.		C									
Performance	Inertia moment	As indicated in a drawing.		B	7.3.1								
	Noise	In each evaluation method: 1) No noise. 2) No horn blowing. 3) No squeaking.		C	7.3.2								
	Sliding sound	No sliding noise.		C	7.3.3								
	Safety on collision	Crack on the steering wheel surface is permissible, but no sharp edge nor crash.		A	7.3.4								

Table 1 (Continued)

Evaluation Item		Evaluation Standard		Quality Rank	Evaluation Method
Performance	Safety on collision	Sharp edge is the edge having the protrusion amount of 3.2 mm or over, the radius of R2.5 mm or less on contact area with Ø 165 sphere, and hardness 90% by shore A scale.		A	7.3.4
	Horn operating force and stroke while blowing	Center horn (Pressure-sensitive type included)	P = 1.5 to 4.0 kgf { 14.7 to 39.2 N} Stroke = 1 to 2 mm P' = 1.0 to 1.5 kgf { 9.8 to 14.7N}	C	7.3.5
		Button horn	P = 0.5 to 1.0 kgf { 4.9 to 9.8 N} Stroke = 1 to 1.5 mm		
		Bar horn	P = 1.5 to 4.0 kgf { 14.7 to 39.2 N} Stroke = 1 to 2 mm P' = 1.0 to 1.5 kgf { 9.8 to 14.7 N}		
		Common: 1) Pressure-sensitive type: P and P' at -30°C shall be 10 kgf{98 N} max. 2) No hitch. 3) The horn shall blow.			
	Cap inserting and drawing force	Inserting force	P = 10 kgf {98 N} max.	C	7.3.6
		Drawing force	When 1, Q = 5 kgf {49 N} min. When 2, Q = 3 kgf {29 N} min.		
		Ornament retaining force	P = 2 kgf { 19.6 N} min.		C
	Rigidity of horn pad	2 mm max.		C	7.3.8

Table 1 (Continued)

Evaluation Item		Evaluation Standard	Quality Rank	Evaluation Method
Conformity to Regulations	Steering impact	1) 1020 kgf {999.6 N} max./24.2 km/H Provided the measurement shall be made in combination with the shaft. 2) No sharp edge of R2.5 max. nor rough surface on the contact area with a $\varnothing$ 165 sphere that faces a driver.	AR	7.4.1
	Passenger protection	HIC 1000 max.	AR	7.4.2
	Display of controls	To meet MVSS No. 101	AR	7.4.3
	Flammability	To meet KES C-H001, Evaluation, Standard class 1.	AR	7.4.4
	Glare-free	To meet the requirements (40 units max.)	AR	7.4.5
Strength	Static bending strength	1) No permanent set at 25 kgf {245 N} max. 2) No crack nor breakage at 100 kgf {980 N} 3) When 50 kgf {490 N} is applied, deflection at a load point shall be 40 mm max. and permanent set 5 mm max.	B	7.5.1
	Static torsional strength	1) No breakage of welded portion core metal, and boss serration. 2) Permanent set shall be 10 mm max. at a load point.	A	7.5.2
	Weld strength	To destruct base metal. In case of destruction in weld, the strength shall exceed 800 kgf {7.84 kN}	A	7.5.3
	Destruction strength and sinking amount of boss unit	1) No crack nor breakage. 2) Boss sinking amount into the shaft (shift in $\mathcal{E}$ direction) shall be 2 mm max. after tightening the nut.	B	7.5.4
	Grip peeling resistance	No peeling-off from the core metal.	B	7.5.5

Table 1 (Continued)

Evaluation Item		Evaluation Standard	Quality Rank	Evaluation Method
Durability	Fatigue durability (Bending and torsional complex durability)	1) No crack nor breakage on the surface and core metal. 2) Torque drop of all screws shall be 30% max. 3) No noise.	A	7.6.1
	Bending durability	1) No crack nor breakage on the surface and core metal. 2) No noise. 3) Torque drop of all screws shall be 30% max.	A	7.6.2
	Excitation durability	1) No deformation, crack nor destruction on each part. 2) No irregularity in the horn circuit. 3) No noise. 4) No looseness of screws.	C	7.6.3
	Operational durability of horn contact point	Voltage drop at contact between contact plate X and boss Y shall be: 0.5 V/A max. for a horn with horn relay. 0.3 V/A max. for a horn without horn relay.	B	7.6.4
	Surface wear resistance	1) No exposure of coated surface. 2) No loss of grain.	C	7.6.5
	Grip wear resistance	1) No exposure of coated surface. 2) No loss of grain.	C	7.6.6
Environmental and chemical resistance	Light resistance	Gray scale, Grade 4 min. (JIS L 0804)	C	7.7.1
	Short-period heat resistance	Hs -06, A2, C A2: Gap between the cap and the main body.	B	KES D-G008

Table 1 (Continued)

Evaluation Item		Evaluation Standard	Quality Rank	Evaluation Method
Environmental and chemical resistance	Long-period heat resistance	H ℓ -1, 04, A2, C A2: Gap between the cap and the main body.	B	KES D-G008
	Cold resistance	Cs-0, A2, C A2: Gap between the cap and the main body.	B	
	Thermal shock resistance	Th-04, D, A2, C No. of the cycles: 10 cycles A2: Gap between the cap and the main body.	B	
	Low-temperature bending strength	No crack on the grip surface.	B	7.7.2
	Low-temperature buckling strength	No crack.	B	7.7.3
	Low-temperature hammer impact strength	No crack.	B	7.7.4
	Liquid resistance	Cr-1, 0	B	KES D-G008
Assembling Serviceability	Ease of wheel-attaching (nut workability)	Nuts shall be picked up by finger tips, and nuts shall come out when the steering wheel is turned over.	C	7.8.1
		The impact socket shall not interfere with any part of the wheel (Metal fitting, wiring, etc.)		
	Attaching and detaching of wheel	The wheel shall be attached and detached.	C	7.8.2
Structure	Surface treatment	No painting nor clear coating on a plated surface.	C	Visual inspection

Table 1 (Continued)

Evaluation Item		Evaluation Standard	Quality Rank	Evaluation Method
Structure	Structure of thread	1) When a part is tightened with screws providing internal thread to steel plate, apply thread sealer on the screws for preventing looseness or use a lockite washers. 2) No deformation, cracks nor breakage in the portion tightened with screws when tightening by the maximum specified torque of the screw. 3) The structure of the steering wheel shall be so designed that there will be no mal-function of the horn if looseness occurs in the portion tightened with screws.	B	Visual and hearing inspection
	Connecting and contact portion	No squeaking when pushing the surface of each portion, where hands may touch in operating the steering wheel, with a finger by a load of 6 kgf (59 N).	C	Hearing inspection
	Horn structure	1) Fix the internal horn cord so that the inclusion due to assembling variation can not occur. 2) The clearance between parts that blow the horn when they contact each other at a point other than the horn contact point shall be at least 2 mm at the minimum value of the assembling variation. 3) Moving portions in operating the horn shall not be of metal to metal touch. However, the horn contact point is excluded.	C	Visual and hearing inspection
		Put a fiber washer 