

KES

Water Hose

KES D-A504

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Appendix

Remark



1. Purpose

This standard aims at securing proper quality by standardizing the specifications.

Remark: This standard and drawings communicate together our requirements.

2. Scope of Application

The standard specifies the water hose for automobiles(hereinafter referred to as "hose").

3. Report of Evaluation Results

The quality evaluation results of quality evaluation at each stage from development to mass production shall be submitted to Kia according to the Appendix.

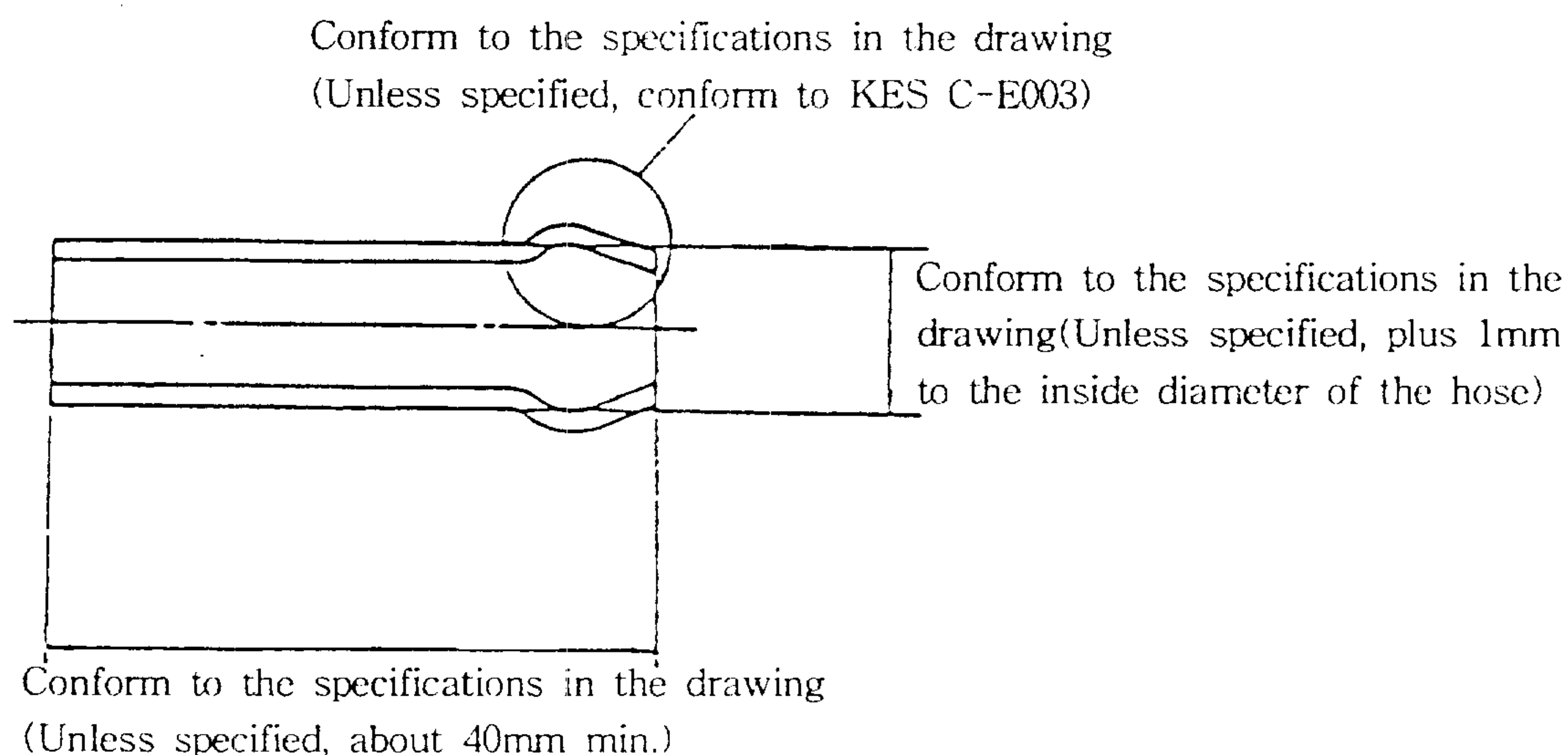
4. Definition of Terminology

(1) Heat resistance temperature

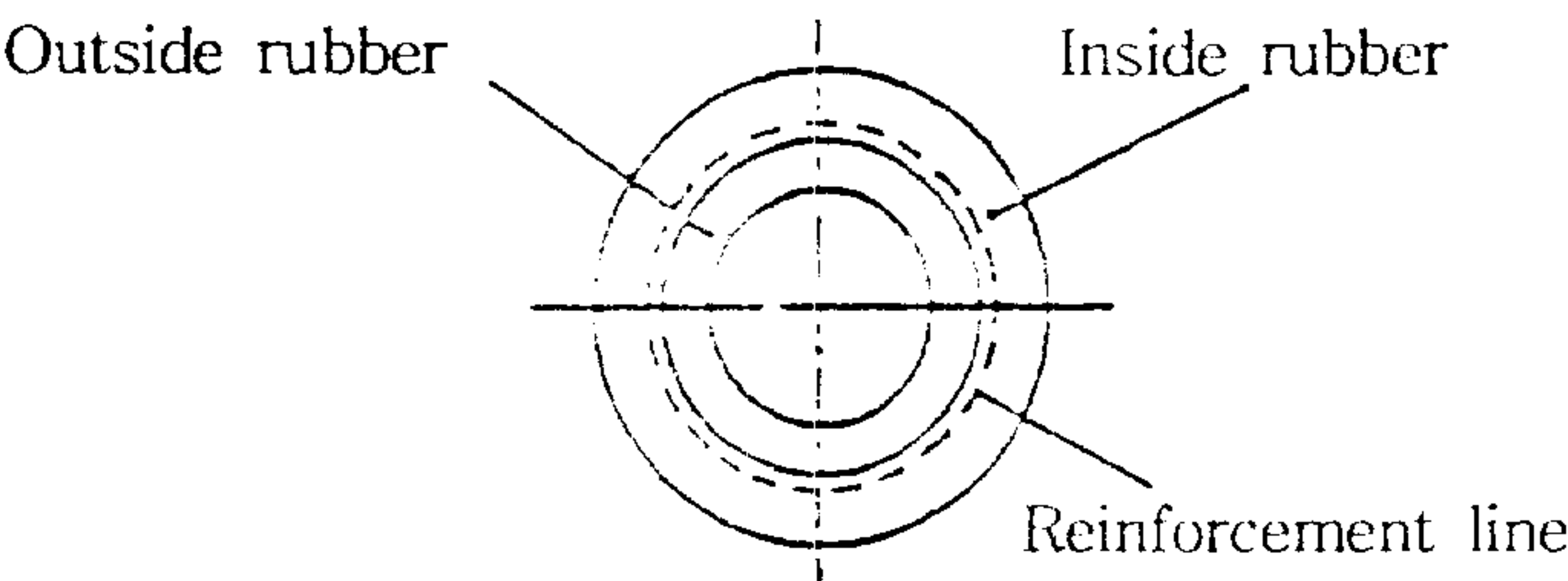
Test temperature in accordance with heat resistance division specified in KES B-L 006(Testing Method for Rubber Materials) (CF: 120℃, DF: 130℃, EF: 150℃)

(2) Standard fitting tube

A tube used when regular fitting tube cannot be applied. As a rule, the shape of a tube shall be as specified in the drawing. Unless otherwise specified, the outside diameter of a tube shall be the value of inside diameter of hose plus 1mm. The shape of bulge shall conform to KES C-E003 and the straight length shall be approximately 40mm or more.



- (3) L.L.C
Kia genuine long-life coolant
- (4) Outside rubber and inside rubber
Refer to following Figure



- (5) Lubricant for attaching
Lubricant for easy connection of hose with a fixed tube. In general, soapy water is used in Kia assembly line.

5. Specification Indicated in Drawings

- (1) Material symbol
Symbols shall be selected from the Table below.

Material Symbol	Type	Structure	Heat Resistance Temperature			For reference
			120℃	130℃	150℃	
R-CF710-Y021	Type 1	Single layer etitirely made up of rubber(all rubber type)	○	-	-	Subtank hose
R-CF710-Y023	Type 3	Reinforcing layer between inside and outside rubbers (middle reinforced type)	○	-	-	Radiator hose
R-DF710-Y023			-	○	-	Bypass hose
R-EF710-Y023			-	-	○	Heater hose

- (2) Hose dimension
 - (a) Inside dimeter
 - (b) Thickness
 - (c) Outside diameter
 - (d) Shape and length
 - (e) Attaching length of a hose with fixed tube and the cross-sectional shape of a hose.

- (3) Seal pressure(at normal temperature)
Evaluation standard of sealability
- (4) Dimensions
 - ① Outside diameter
 - ② Bulge diameter
 - ③ Attaching length of a hose
- (5) Parts number of applicable clamp applied
- (6) Amount of dusts *(only when necessary)
- (7) Application of lubricant(die separation chemicals) *(only when necessary)

6. Evaluation Standard

Evaluation standard of the hose shall conform to Table 1.

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

Evaluation Item			Evaluation Method	
Du- ra- bi- li- ty	Vibration resistance	First evaluation	7.5.1	First evaluation method
	• Operating force of slider	Second evaluation (Evaluation item tested after evaluating the vibration resistance)	• 7.3.1	Second evaluation method
	•• Noise		•• 7.3.7	Third evaluation method
		Third evaluation (Evaluation item tested after evaluating the operating force)		

Remark 2. The quality rank shall be represented by A, AR, B or C.
The definitions shall conform to KMS Q 40001(Determination and Procedure of Quality Ranking).

Table 1

Evaluation Item		Evaluation Standard			Quality Rank	Evaluation Method
Per- for- mance	Change of outside diameter	Type	Inside diameter	Change of outside diameter(%)	B	7.2.1
		1	Less than 40	15 or less		
			44 or more	Standard value or less indicated in the drawing		
		2	Less than 44	15 or less		
			44 or more			
	Burst pressure	Satisfy the requirements in Attached Table 1			B	7.2.2
	Negative pressure	(1) Satisfy the requirements in Attached Table 1 (2) No abnormal shrinkage nor deformation etc.			B	7.2.3
	Vibration resistance	No burst, partial swelling nor leakage at joint part, etc. harmful to use			B	7.2.4
	• Change of outside diameter	10% or less			B	• 7.2.1
	Peeling-off force (applicable only to type 3) kgf/cm {N/m}	1 {981} or more			B	7.2.5
	Heat-aging resistance	No crack nor damage, etc. harmful to use			B	7.2.6
	• Burst pressure	Satisfy the requirements in Attached Table 1			B	• 7.2.2
	Cold resistance	No crack nor damage, etc. harmful to use			B	7.2.7
	Ozone resistance	No crack nor other trouble			B	7.2.8
	Torsion torque	Shall get an approval from Kia by submitting measured data			B	7.2.9
	Tightness	Satisfy the requirements indicated in drawings			B	7.2.10
	Attaching force	Satisfy the requirements indicated in drawings			B	7.2.11
	Drawing force	Satisfy the requirements indicated in drawings			B	7.2.12

Table 1 (Continued)

Evaluation Item			Evaluation Standard	Quality Rank	Evaluation Method
Physical performance of rubber layer	Tensile strength	Tensile strength Kgf/cm ² {MPa}	100 or more	B	7.3.1
		Elongation %	300 or more		
	Hardness Hs		70±5	B	7.3.2
	Heat aging resistance	Change of tensile strength %	-30 or less	B	7.3.3
		Change of elongation %	-50 or less		
		Change of hardness Hs	0 ~ +15		
	Chemical resistance	Change of tensile strength %	-25 or less	B	7.3.4
		Change of elongation %	-40 or less		
		Change of hardness Hs	-5 ~ +10		
		Volume change rate %	-5 ~ +5		
	Oil resistance		Volume change: 200% or less	B	7.3.5
	Compression permanent strain %		80 or less	B	7.3.6
Dimension shape	External appearance		No flaw nor swelling, etc. harmful to use	B	Visual inspection
	Length	(1) Satisfy the requirements indicated in the drawing (2) In case dimensional tolerance are not indicated in the drawing, the requirements in the Attached Table 2 shall be met	B	7.4.1	
	Curve shape		B	7.4.2	
	Outside diameter		B	7.4.3	
	Inside diameter		B	7.4.4	
	Thickness		B	7.4.5	
	Deflection of thickness		Hose of same diameter At both ends: 0.7mm or less Hose of different diameter At both ends: 1.0mm or less	B	7.4.6
	Amount of dusts		Satisfy the requirements indicated in the drawing	B	7.4.7
	Residual amount of Die separating chemicals (joint part)		(1) Die separation chemicals shall not be used (2) In case indicated in the drawing Die separation chemicals shall be applied	B	Visual inspection

7. Evaluation Method

7.1 Common evaluation condition

7.1.1 Standard atmospheric condition for testing

Unless otherwise specified, the standard atmospheric condition shall be a standard temperature condition of 20°C, class 15(20±15°C) and a standard humidity condition of 65%, class 20(65±20%) specified in KS A 0006.

7.2 Performance

Pressurizing conditions in 7.2.1, 7.2.2 and 7.2.3 shall conform to Table 2.

Table 2

Type	Inside diameter (mm)	Pressurizing kgf/cm ² (MPa)
Type 1	less than 44	1 {0.10}
	44 or more	Determine each item through discussion
Type 2	less than 44	5 {0.49}
	44 or more	3 {0.29}

7.2.1 Change of outside diameter

Perform the test according to 4.2.1(1) in KS M 6540(Testing Method of Rubber Hose), calculate the change of the outside diameter according to the following formula by measuring the outside diameter of a hose.

$$\Delta D(\%) = \frac{D2 - D1}{D1} \times 100$$

Where, ΔD : Change of outside diameter

D1 : Outside diameter before pressurization

D2 : Inside diameter during pressurization

A straight line hose of about 450mm in length shall be used as test sample and bent hose may be used.

7.2.2 Burst pressure

Apply pressure according to 4.2.1(2) in KS M 6540 until the hose burst.

7.2.3 Negative pressure

Lessen the pressure of the hose from the atmospheric pressure to negative pressure(guage pressure) specified in the Appendix Table 1 according to 4.2.1 in KS M 6540. 5 minutes after the procedure above, evaluate the presence of abnormal shrinkage and deformation.

7.2.4 Vibration resistance

- (1) Take test samples from the product. Fix the one end of a hose and connect the other end to the testing device with it connected to a vibration applier so as to make the condition the mounted one, if possible.
- (2) While operating the testing device, circulating the fluid under the condition in Table 3, evaluate the presense of burst, partial swelling and leakage at the connecting part harmful to use.
- (3) After performing the test above, calculate the change of the outside diameter according to the formula of 7.2.1 by measuring the outside diameter of the undamaged hose.
- (4) When it is difficult to take test samples from the product, straight line hoses($l=200\text{mm}$) may be used. When it is difficult to use a regular tube at the development stage(before S-2), use a fitting tube.

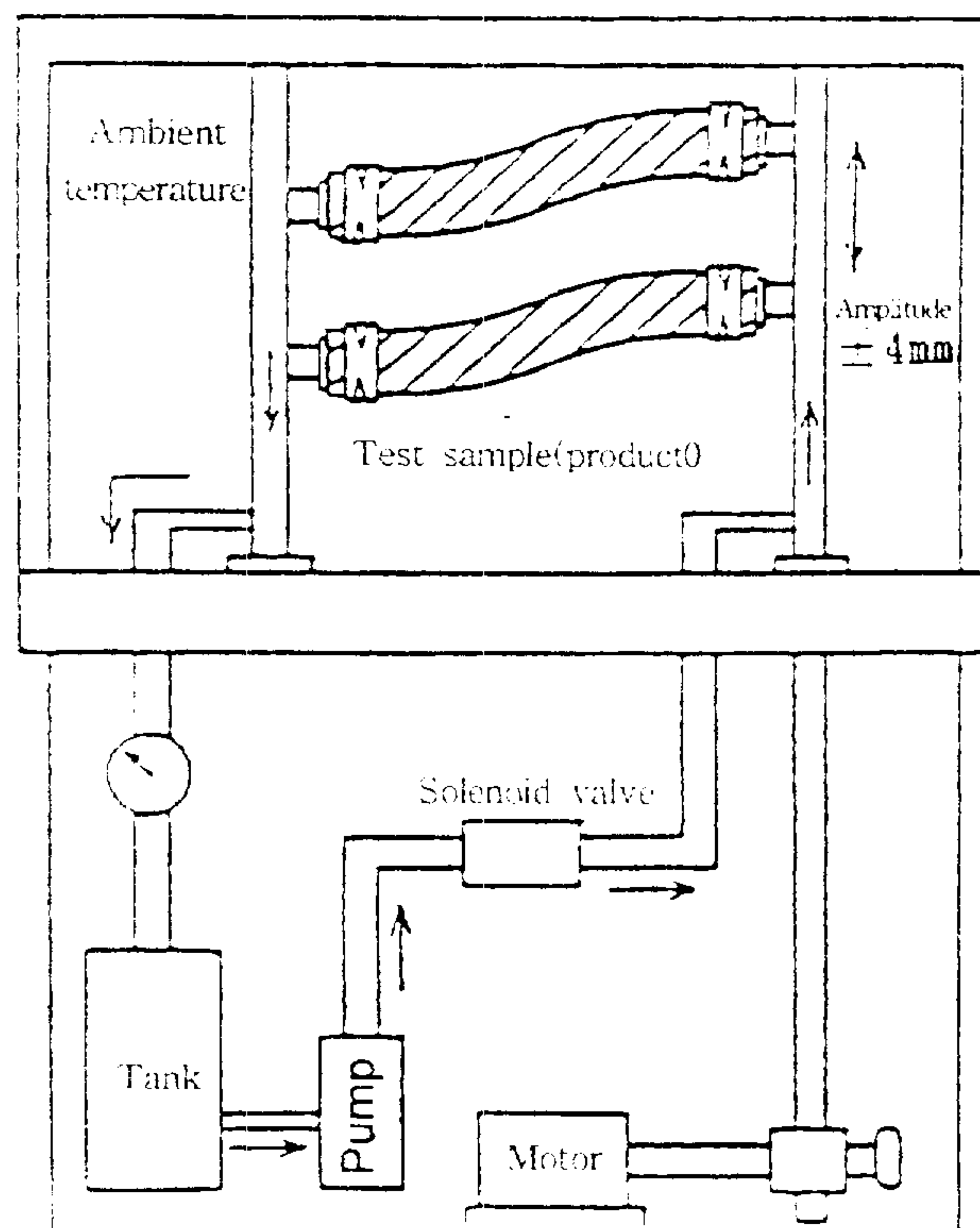


Fig. 1