

Oil Hoses for Automatic Transmission

KES

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Contents

1. Purpose
2. Scope of Application
3. Report of Evaluation Result
4. Definition of Terminology
5. Specifications 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 specification.

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

2. Scope of Application

This standard specifies oil hoses for automatic transmission for automobiles (hereinafter referred to as the "hose").

3. Report of Evaluation Result

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

4. Definition of Terminology

- (1) The hose shall have three layered structure as shown in Fig. 1. The name of each layer shall be as follows.

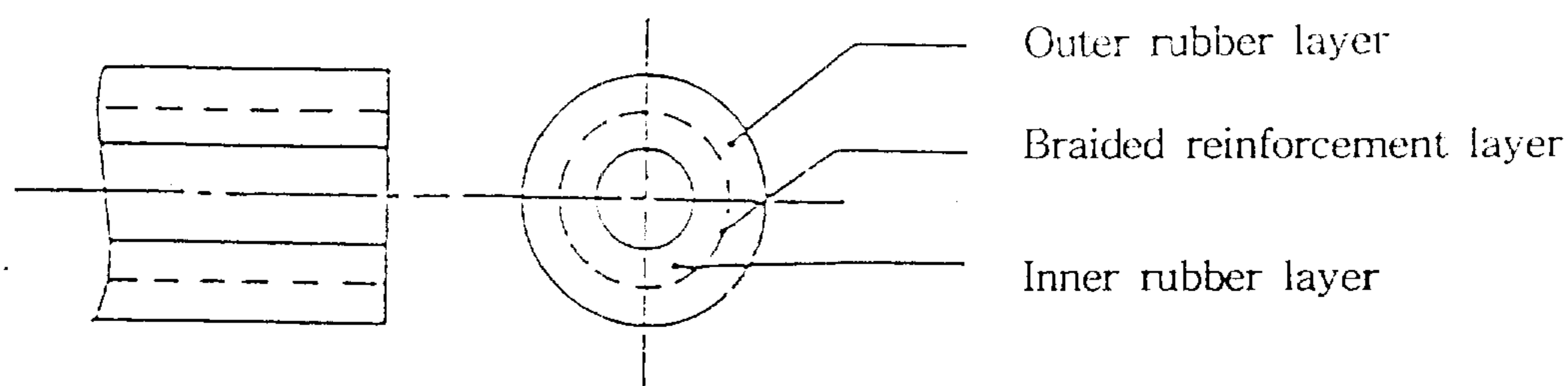


Fig. 1

(2) ATF

- ① Abbreviation of automatic transmission fluid
- ② Unless otherwise specified, ATF-MIII specified in KES B-M039(Automatic Transmission Oil) shall be used.

5. Specifications Indicated in Drawings

- (1) External dimension
- (2) Hose dimension

The hose dimensions are indicated in Table 1 as nominal No.

Table 1

Unit : mm

Nominal	Evaluation Standard				
	Inside Diameter		Outside Diameter		Deviation of Thickness
	Standard Dimension	Allowable Error	Standard Dimension	Tolerance	
7	7.0	±0.3	15.0	±0.5	0.5 or less
9	9.0	±0.3	17.0	±0.5	0.5 or less

6. Evaluation Standard

The evaluation standard of the hose shall conform to Table 2.

Remark 1. The way of reading evaluation items and methods in Table 2 shall conform to the following example.

Evaluation Item		Evaluation Method	
Dura- bili- 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	Third evaluation (Evaluation item tested after evaluating the operating force)	•• 7.3.7 Third evaluation method

Remark 2. The quality rank shall be represented by A, AR, B or C.

The definitions shall conform to KMS Q410001(Determination and Procedure of Quality Ranking.)

Table 2

Evaluation Item		Evaluation Standard	Evaluation Rank	Evaluation Method	
Appearance /external dimension	Appearance of hose	(1) The inside and outside diameters of a hose shall be even and inside surface of the hose shall be smooth. (2) Any flaw, blowhole or defect which is harmful to use shall be within the standard of the minimum-acceptable test piece.	A	Visual	
	External dimension of hose	(1) The inside and outside diameters and the deviation of thickness shall satisfy the evaluation standards of Table 1. (2) The deviations except (1) shall be within the allowable error of dimension indicated in the drawings of a supplier	A	gauge	
Perform- ance of rubber materials	Tensile strength		A	7.2.1	
	Elongation				
	Hardness		A	7.2.2	
	Compression permanent set		A	7.2.3	
	Crack Strength		A	7.2.4	
	Heat resis- tance	Change of tensile strength	-40 ~30%	A	7.2.5
		Change of elongation	50% or more		
Change of hardness		-5-20			

Table 2 (Continued)

Evaluation Item			Evaluation Standard	Evaluation Rank	Evaluation Method
Performance of rubber materials	Oil resistance	Change of tensile strength	-60-30%	A	7.2.6
		Change of elongation	-60% or more		
		Change of hardness	-35-0		
		Change of volume	80% or less		
	Special oil resistance	Change of tensile strength	-40-10%	A	7.2.7
		Change of elongation	-30-20%		
		Change of hardness	-20-0		
		Change of volume	0-30%		
	Cold resistance (Brittleness temperature)		-30°C or less	A	7.2.8
	Special heat resistance	Elongation	100% or more	A	7.2.9
		Change of hardness	0-20		

Table 2 (Continued)

Evaluation Item			Evaluation Standard	Evaluation Rank	Evaluation Method
Performance of hose	Seal pressure		8Kgf/cm ² {784 kPa} or more	A	7.3.1
	Drawing force		10kgf {98N} or more	A	7.3.2
	Pressure resistance	Appearance	No abnormality such as partial swelling	A	7.3.3
		Change of length	-10-0%		
		Change of outside diameter	0-10%		
	Bursting pressure		50Kgf/cm ² {4900 kPa} or more	A	7.3.4
	Heat resistance		No abnormality	A	7.3.5
	Cold resistance			A	7.3.6
	Flexing strength		No external abnormality such as crack	A	7.3.7
	• Bursting pressure		50Kgf/cm ² {4900 kPa} or more	A	7.3.4
Cover cutting resistance		No abnormality	A	7.3.8	
Insertion strength		(1) Hose of nominal 7 : 10kgf {98N} or less (2) Hose of nominal 9 : 12kgf {117.6N} or less	B	7.3.9	
Ozone resistance (static)		No abnormality	A	7.3.10	

Table 2 (Continued)

Evaluation Item		Evaluation Standard	Evaluation Rank	Evaluation Method
Performance of hose	Adhesive properties	(1) oblong test piece : 2kgf {19.6N} or more (2) Annular test piece : 3kgf {29.4N} or more	A	7.3.11
	Deterioration of braided reinforcement	no abnormality	A	7.3.12
	Bending strength	(1) Hose of nominal 7 : 3.5mm or less (2) Hose of nominal 9 : 5.0mm or less	B	7.3.13
	Elongation	15% or more	A	7.3.14
	Negative pressure resistance	Change in outside diameter : 5% or less	A	7.3.15
	Crack resistance to ATF-MIII	25% or more	A	7.3.16
	Metallic corrosion acceleration	No rust on a pipe and a hose clip	A	7.3.17
Compound deterioration properties	Compound deterioration resistance	No external abnormality	A	7.4
	• Seal pressure	(1) 240 hours : 8kgf {78.4N} or more (2) 480 hours, 720 hours : 6kgf {58.8N} or more	A	7.3.1
	• Drawing force	10kgf {98N} or more	A	7.3.2
	• Bursting pressure	50kgf/cm ² {4900 kPa} or more	A	7.3.4
	• Cold resistance	No abnormality	A	7.3.6

7. Evaluation Method

7.1 Common evaluation conditions

7.1.1 Standard atmospheric conditions for testing

Unless otherwise specified, the standard atmospheric condition shall be a standard temperature condition of 20°C, class 15($20 \pm 15^\circ\text{C}$) and a standard humidity condition of 65%, class 20($65 \pm 20\%$) specified in KES A 0006(Standard Atmospheric Conditions for Testing)

7.1.2 Properties of test sample and test piece used for 7.2 performance test of rubber materials

(1) Standard atmospheric condition of test sample

Test sample shall be left for 24 hours or more after hardening, and it shall be under the room standard atmospheric condition for one hour or more.

(2) Properties of test piece

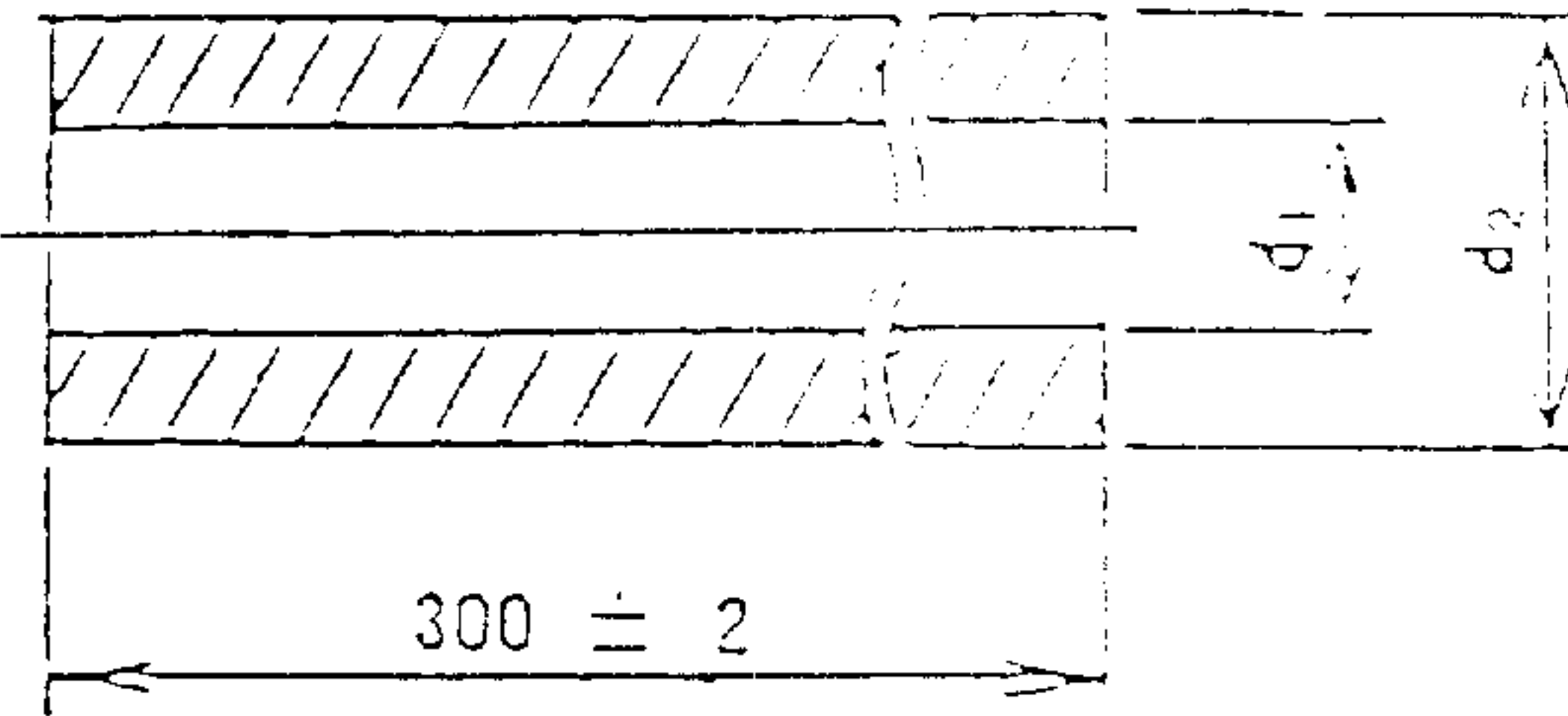
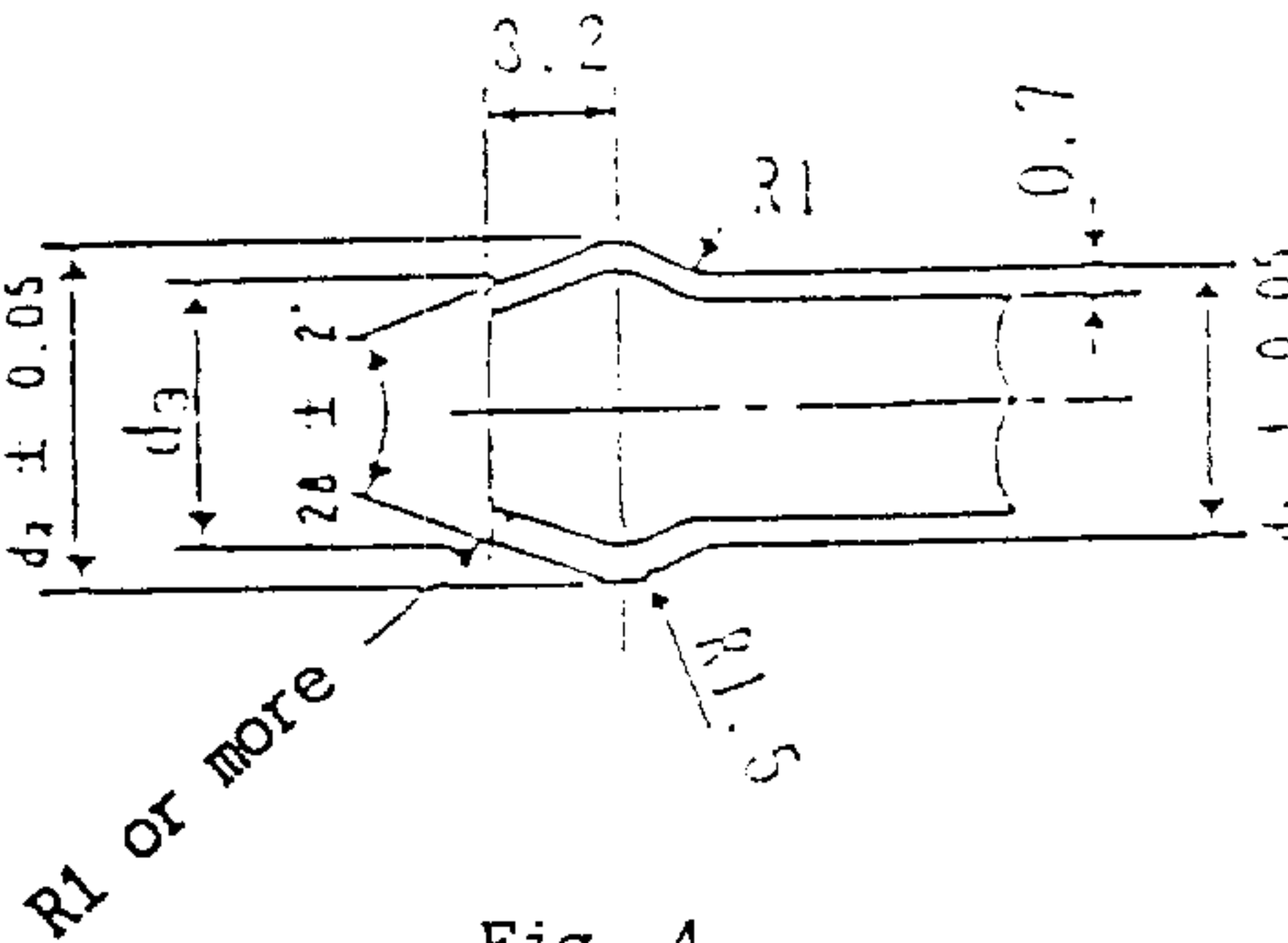
Select the test piece from either products or the samples hardened under the same condition as those of the products. Being hardened under the same condition means that the difference of specific gravity is within 0.03, and the difference of volume change ratio in equilibrium swelling by the swelling test specified in KES B-L006, 24(Testing Method of Rubber Material) is within 5%.

7.1.3 Test sample used for the performance test 7.3 of hose

(1) Shape of test sample

Unless otherwise specified, the test samples specified in Table 3 shall be used.

Table 3

Name	Specification												
Hose	Unit : mm  Fig. 3 Table 4 <table><tr><th>Nominal</th><th>d1(mm)</th><th>d2(mm)</th></tr><tr><td>7</td><td>7.4 or more</td><td>14.8 or less</td></tr><tr><td>9</td><td>9.4 or more</td><td>16.8 or less</td></tr></table>	Nominal	d1(mm)	d2(mm)	7	7.4 or more	14.8 or less	9	9.4 or more	16.8 or less			
Nominal	d1(mm)	d2(mm)											
7	7.4 or more	14.8 or less											
9	9.4 or more	16.8 or less											
Hose clip	Hose clip of Table 5 specified in KES E-F013 (Hose clip) shall be used. Table 5 <table><tr><th>Nominal</th><th>Hose clip</th></tr><tr><td>7</td><td>99287 1400 P</td></tr><tr><td>8</td><td>99287 1600 P</td></tr></table>	Nominal	Hose clip	7	99287 1400 P	8	99287 1600 P						
Nominal	Hose clip												
7	99287 1400 P												
8	99287 1600 P												
Pipe	Unit : mm  Fig. 4 ① Surface treatment : Double layered (tin zinc + zinc) green chromate plating shall be applied and it shall satisfy TC-Co9 specified in KES B-R001 Table 6 <table><tr><th>nominal</th><th>d1(mm)</th><th>d2(mm)</th><th>d3(mm)</th></tr><tr><td>7</td><td>Ø 8</td><td>Ø 9.3</td><td>7.6-8.2</td></tr><tr><td>9</td><td>Ø10</td><td>Ø11.5</td><td>9.7-10.3</td></tr></table>	nominal	d1(mm)	d2(mm)	d3(mm)	7	Ø 8	Ø 9.3	7.6-8.2	9	Ø10	Ø11.5	9.7-10.3
nominal	d1(mm)	d2(mm)	d3(mm)										
7	Ø 8	Ø 9.3	7.6-8.2										
9	Ø10	Ø11.5	9.7-10.3										
ATF	ATF-MIII specified in KES B-M039												