

KOREAN INDUSTRIAL STANDARD

Telescopic Shock Absorbers

1. Scope

This Korean Industrial Standard specifies telescopic shock absorbers for use in automobiles, hereinafter referred to as "shock absorbers".

2. Class and Type

Shock absorbers shall be classified, as shown in Fig. 1, into 7 classes according to the assembly of body and attached part or shall be divided into 4 types, as shown in supplemental Fig. 1, by the shapes of upper and lower attached parts.

3. Construction

Shock absorber shall consist of body and the attached parts, produce necessary damping force mainly by the hydraulic resistance according to the movement of piston inside of the body, and decrease vibration.

Related Standards:	KS R 0413	Commercial Tolerance (Presswork)
	KS R 0013	General Rules of Electroplating for Automobile Parts
	KS R 0014	General Rules of Coating Films for Automobile Parts
	KS D 3503	Rolled Steel for General Structural Purposes
	KS D 3501	Hot-Rolled Mild Steel Plate, Sheets and Strip
	KS D 3512	Cold-Rolled Carbon steel Sheet and Strip
	KS D 3517	Carbon Steel Tubes for Machine Structural Purposes
	KS D 3507	Carbon Steel Pipes for Ordinary Piping
	KS M6617	Rubber Materials for Vibration Isolators

4. Shape and Dimensions

- 4.1** The shape and dimensions of the shock absorber shall, as a rule, comply with Supplemental Fig. 1.
- 4.2** The shape and dimensions of the body shall, as a rule, comply with Supplemental Table 2.
- 4.3** The shape and dimensions of the attached portion shall, as a rule, comply with Supplemental Fig. 3.
- 4.4** The shape and dimensions of the attached parts shall, as a rule, comply with Supplemental Fig. 4.
- 4.5** The stroke of shock absorber shall, as a rule, comply with Supplemental Table 1.

5. Quality

- 5.1** The appearance of shock absorber shall be free from detrimental defects in use.

5.2 Damping Force

- (1)** The damping force shall be specified with the value at 0.3m/s in piston velocity.
- (2)** The range of damping force at elongated side and compressed side shall, as a rule, comply with Supplemental Table 2 and Supplemental Table 3 respectively. However, the sum of damping force at elongated side and compressed side shall not preferably exceed the maximum value given in Supplemental Table 2.
- (3)** The specified value of damping force shall, as a rule, be within the range of Supplemental Table 2 and Supplemental Table 3, and shall be in accordance with the each standard value specified by manufacturer.
- (4)** The tolerance on specified damping force shall comply with Supplemental Table 4.
- (5)** The characteristics of damping force shall, as a rule, be chosen within the range of standard performance specified by manufacturer.

5.3 Painting

The painting of the body shall, as a rule, comply with TAL, TFT or TAA of KS R 0014 (General Rules of Coating Films for Automobile Parts). However, the starting part shall be treated by the electric tin circuit mite.

5.4 Leakage

The outer surface of shock absorber shall be free from the leakage of fluid by inspection of naked eyes or ultra-violet rays, when tested as follows:

- (1) The shock absorber shall be inspected after reciprocating the whole strokes for 10 to 15 cycles.
- (2) The shock absorber shall be inspected again after putting upside down, under the state of complete compression for 24 hours.

5.5 Weld Strength

The tensile load of welded part shall be specified as follows. However, the numerals in the bracket shall be applicable only for motor cycle.

Class	Tensile load
Class 1	2000kgf min. (800kgf min.)
Class 2	2500kgf min. (1000kgf min.)
Class 3	2500kgf min. (1000kgf min.)
Class 4	4000kgf min. (1800kgf min.)
Class 5	7000kgf min. (2800kgf min.)
Class 6	10000kgf min. (4000kgf min.)

5.6 Durability

Shock absorber shall be inspected in accordance with Reference 3, and inferiority shall be specified as follows:

- (1) When the characteristics of shock absorber is changed more than 15% of that before test.
- (2) When the fluid is decreased more than 10% of total volume of liquid specified in draft.
- (3) When the bearing, seal and piston rod is excessively worn out.

6. Test of Characteristics of Damping Force

6.1 Purpose

The damping force shall be tested and measured, as type test, to the velocity of piston in the body of shock absorber.

6.2 Equipment

The equipment shall be that of measuring and recording the damping force by connecting the lower part of shock absorber to the vibrator, and the upper part to spring apparatus.

6.3 Conditions

- (1) Temperature of laboratory: The normal temperature.
- (2) Temperature of test sample: $20 \pm 3^{\circ}\text{C}$
- (3) Vibrating amplitude (stroke) (a) 20 to 100mm
- (4) Vibrating speed (piston speed)(v)

$$V = \frac{\pi a n}{6} \times 10^{-4} \text{ (m/s)}$$

where, n: revolutions (rpm)

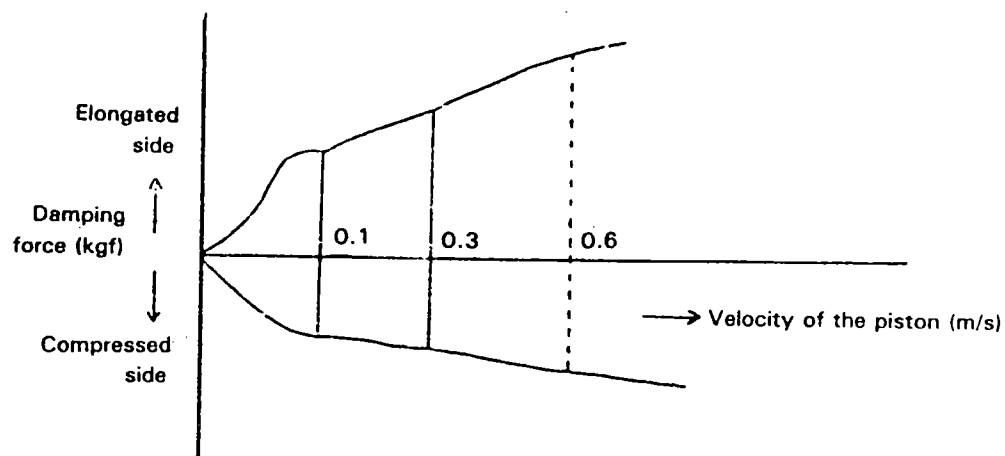
- (5) Position of vibration: The center of stroke width.
- (6) Direction of vibration: Vertical direction.

6.4 Operation

- (1) Attach the upper part of test sample to the equipment.
- (2) Draw a base line.
- (3) Attach the lower part.
- (4) Vibrate shock absorber under testing condition, after operating several times, measure and record the damping force.

6.5 Marking

Shock absorber shall be marked according to the following figure.



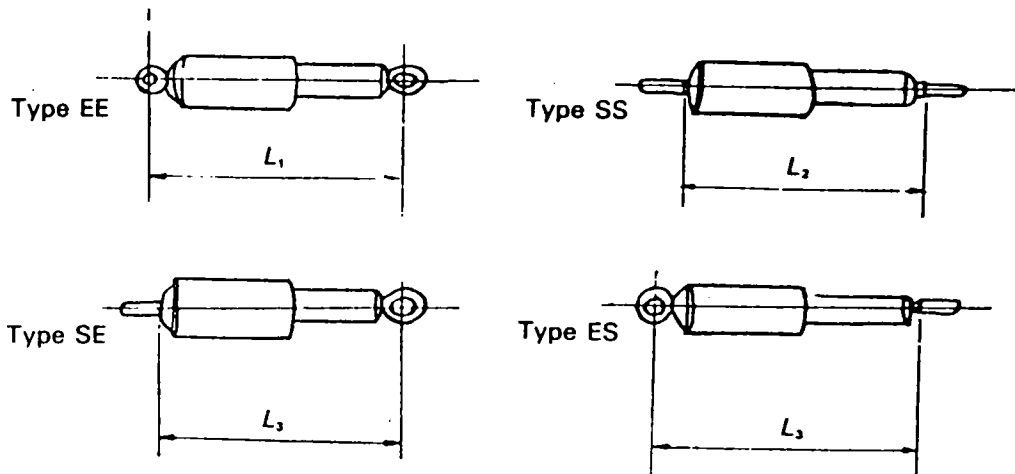
7. Inspection

- 7.1 The appearance shall be visually inspected and the result shall meet the requirement of 5.1
- 7.2 The shape and dimensions shall meet the requirement of 4.
- 7.3 The damping force shall be tested in accordance with 6 and the result shall meet the requirement of 5.2.
- 7.4 The paintings shall meet the requirement of 5.3.
- 7.5 Leakage, weld strength and durability shall meet the requirements of 5.4, 5.5. and 5.6.

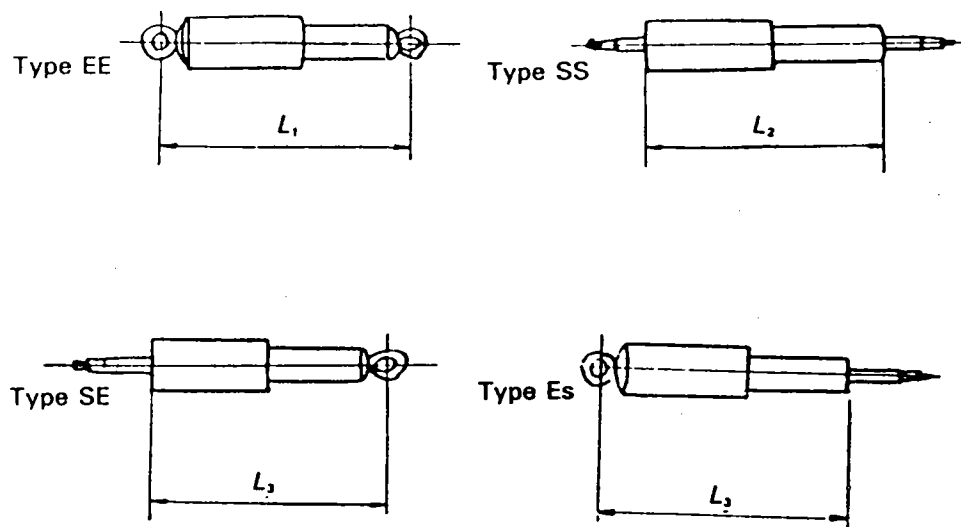
8. Marking

Manufacturer's name (or abbreviation) shall be indelibly marked on the visible place.

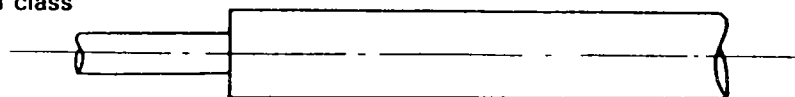
(Class 1, Class 2, Class 3, Class 4 and Class 5)



Class 6



Special class



Supplemental Fig. 1. Shape and dimensions of shock absorber.

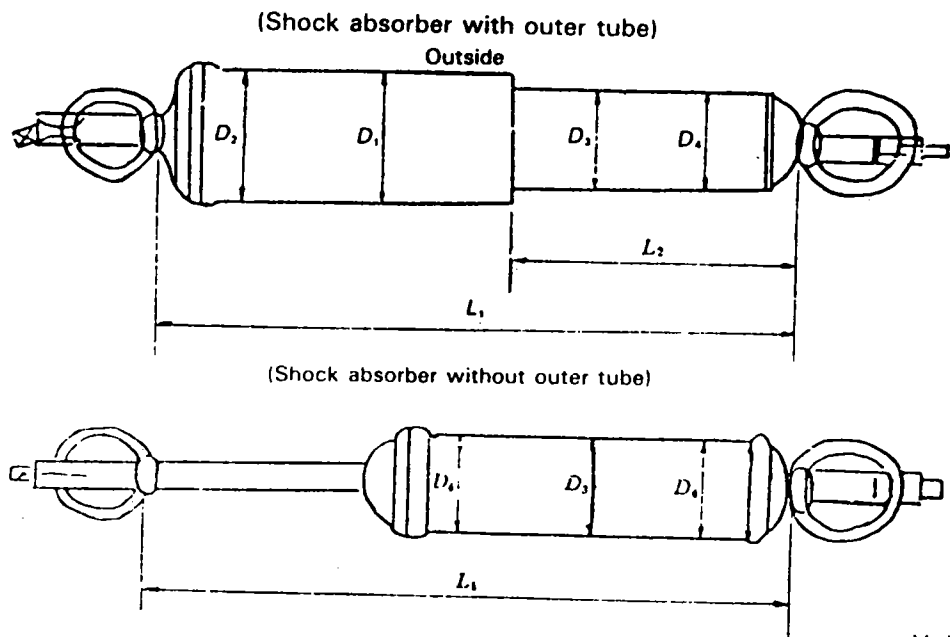
Class	Symbol	Designation of the body	Designation of the attached part	Basic length			Tolerance on minimum length	Tolerance on maximum length
				L ₁ (Type EE)	L ₂ (Type SS)	L ₃ (Type SE Type ES)		
Class 1	SA 1	20	20	90	70	80	+ 3 - sign side shall not be specified	+ sign side shall not be specified - 3
Class 2	SA 2	25	25 30	108	82	95		
Class 3	SA 3	25 30						
Class 4	SA 4	35	35	135	99	117		
Class 5	SA 5	35 40	160	120	140	140	+ 4 - sign side shall not be specified	+ sign side shall not be specified - 4
Class 6	SA 6	50	50	190	120	155		
Special class	STS	Shape dimensions shall, as a rule, comply with Reference 5.						

- Remarks**
1. Shock absorber without outer tube may be used (see Supplemental Fig. 2)
 2. The designation of the body shall, as a rule, be indicated by the dimensions of inner dia. of cylinder.
 3. The designation of attached part, except 25 and 35S, shall be indicated by the designation of the body assembled upon standrd.
 4. The minimum and maximum length of shock absorber shall be calculated by the following equations.

Minimum length = Basic length + Stroke

Maximum length = Basic length + 2 × stroke

Supplemental Fig. 2. Shape and Dimensions of the Body

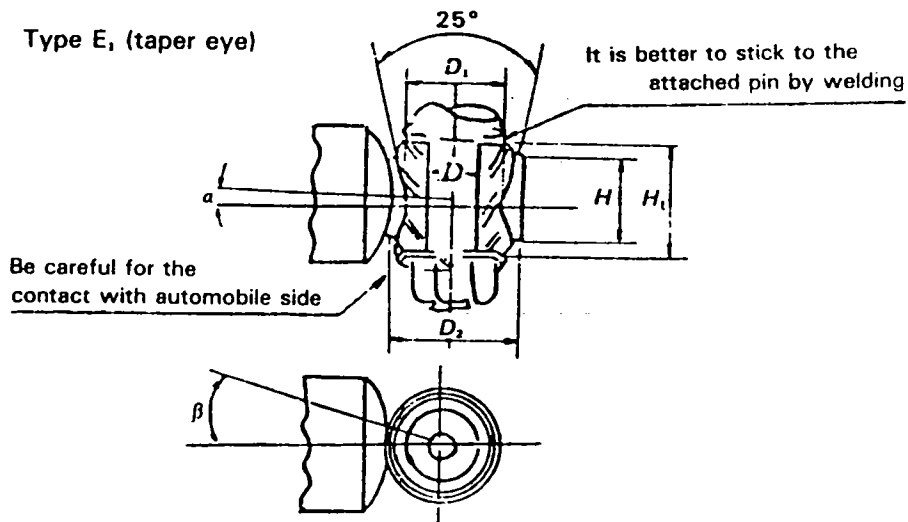


Unit: mm

Class	Outer diameter				Basic dimensions	
	D_1	D_2	D_3	D_4	L L_1	L_2
Class 1	40 max.	42 max.	33 max.	35 max.	62	35 min.
Class 2	48 max.	50 max.	40 max.	42 max.	72	36 min.
Class 3	54 max.	56 max.	45 max.	47 max.		
Class 4	65 max.	67 max.	55 max.	57 max.	85	43 min.
Class 5	75 max.	77 max.	65 max.	67 max.	103	97 min.
Class 6	90 max.	92 max.	80 max.	82 max.	120	108 min.

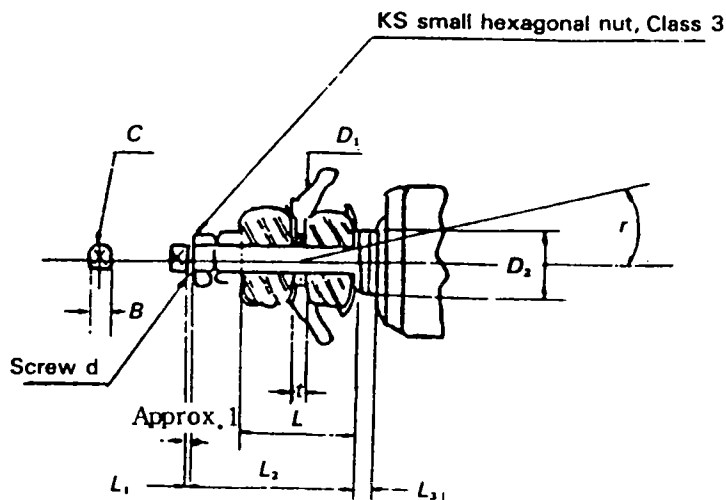
- Remarks**
- Shock absorber without outer tube may be used.
 - D_1 and D_2 indicate the nominal dimensions of the pipe.
 - D_2 shall be indicated by the dimensions of the basic dimension extracted by the dimensions of attached part.
 - L_2 shall be indicated by the minimum dimensions from the lower part of the outer tube to the lower part of the body.
 - The dimensions of D_4 may be less than that of D_3 .

Type E(eye)

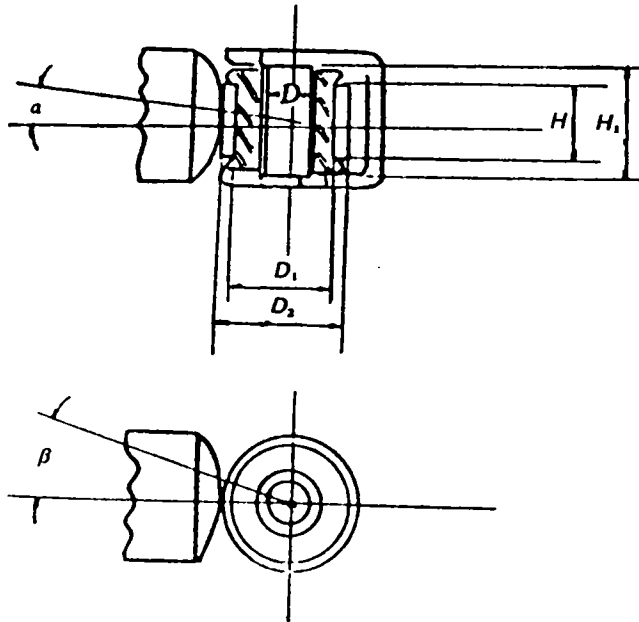


Type S(start)

Type S₁ (for 20, 25 and 30 in designation of attached part)



Type E₂ (strainght eye)



Type S2 (for 35 and 40 in designation of attached part, only suitable for the case of 35, 40 in designation of the body)

