

Automotive parts - Plastic clips for interior and exterior

1 Scope

This standard specifies the resin push-pull clips used for tightening automotive interior and exterior parts (hereinafter referred to as "clips").

Note

The resin push-turn clips, push-push clips and push-screw clips shall be as specified in **Annex A to C (Informative)**.

2 Normative reference

The following standards contain which, thorough reference in this Standard, constitute provisions of this Standard. The most recent editions of the standard indicated below shall be applied.

JIS G3141	Cold-reduced carbon steel plates and strips
JIS K7100	Plastics -- Standard atmospheres for conditioning and testing
JIS K7111-1	Plastics -- Determination of Charpy impact properties -- Part 1: Non-instrumented impact test
JIS K7111-2	Plastics -- Determination of Charpy impact properties -- Part 2: Instrumented impact test
JIS K7161	Plastics -- Determination of tensile properties -- Part 1: General principles
JIS K7162	Plastics -- Determination of tensile properties -- Part 2: Test conditions for moulding and extrusion plastics
JIS K7191-1	Plastics -- Determination of temperature of deflection under load -- Part 1: General test method
JIS K7191-2	Plastics -- Determination of temperature of deflection under load -- Part 2: Plastics and ebonite
JASO M902	Road vehicles -- Interior parts and materials - Measurement methods of diffused volatile organic compounds (VOC)

3 Structure, attachment and detachment

3.1 Structure

The clip consists of a grommet and pin as shown in **Figure 1**.

The pin is the part pressed with fingers to insert the resin clip, as such the pin expands the grommet base portion. The grommet is the part that joints two plates with its base portion expanded by the pin being pressed.

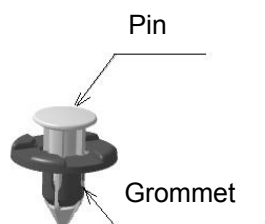


Figure 1 Structure of clip

3.2 Attachment and detachment

As shown in **Figure 2**, the clip is attached by inserting the grommet into the plates and pressing the pin, and detached by pulling up the pin by a tool.

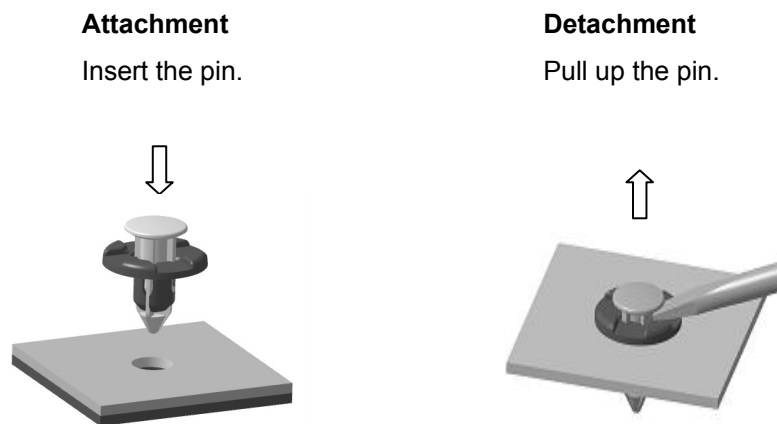


Figure 2 Attachment and detachment

4 Types and type codes

The clips are classified into two types as shown in **Table 1**: standard type and ergonomic-compliant type.

Table 1 Types and type codes

Units: mm			
Type name	Type code	Attachment hole diameter	Attachment panel thickness
Standard push-pull clip	PC1-6×4	Φ6	3.0-4.5
	PC1-6×5		4.5-6.0
	PC1-7×2	Φ7	1.5-2.5
	PC1-7×3		2.5-4.0
	PC1-8×2.5	Φ8	1.5-3.5
	PC1-8×4.5		3.5-5.5
	PC1-8×7		6.0-8.0
	PC1-9×4	Φ9	3.0-5.0
	PC1-9×6.5		6.0-7.0
	PC1-10×4	Φ10	3.5-4.0
	PC1-10×4.5		4.0-5.0
	PC1-10×7.5		7.0-8.0
Ergonomic-compliant push-pull clip	PC1E-6×3.5	Φ6	2.5-4.5
	PC1E-9×5	Φ9	4.3-6.4
	PC1E-9×5.5		5.0-6.0
	PC1E-9×6.5		6.0-7.0
	PC1E-10×4.5	Φ10	3.5-5.5

5 Requirements

5.1 Performance

5.1.1 Standard clips

The required performance of the standard clips shall be as shown in **Table 2**.

If higher tensile breaking force is required, it shall be an additional specification.

Table 2 Performance of standard clips

Units: N

Type code	Insertion force	Tensile breaking force
PC1-6×4	80 max.	150 min.
PC1-6×5		
PC1-7×2		
PC1-7×3		
PC1-8×2.5		200 min.
PC1-8×4.5		
PC1-8×7		
PC1-9×4		
PC1-9×6.5		
PC1-10×4		
PC1-10×4.5		300 min.
PC1-10×7.5		

5.1.2 Ergonomic-compliant clips

The required performance of the ergonomic-compliant clips shall be as shown in **Table 3**.

Table 3 Performance of ergonomic-compliant clips

Units: N

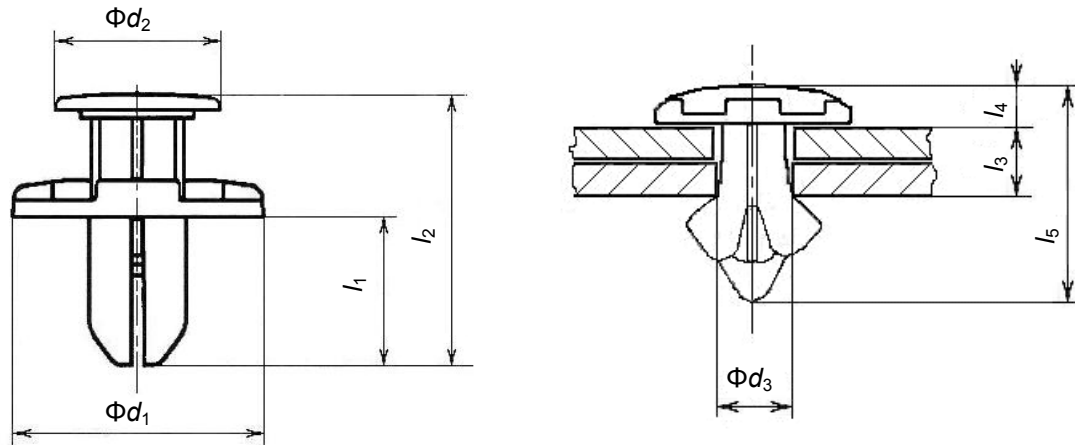
Type code	Insertion force	Tensile breaking force
PC1E-6×3.5	30 max.	150 min.
PC1E-9×5		200 min.
PC1E-9×5.5		
PC1E-9×6.5		
PC1E-10×4.5		300 min.

5.2 Shapes and dimensions

5.2.1 Standard clips

The shapes and dimensions of the standard clips shall be as shown in **Table 4**.

Table 4 Shapes and dimensions of standard clips



Units: mm

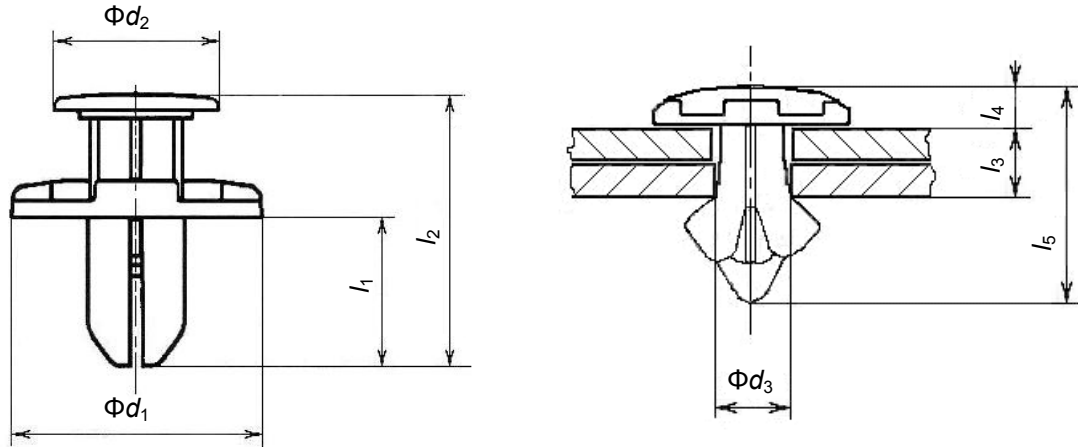
Type code	d_1		d_2		l_1		l_4	
	Standard dimension	Tolerance	Standard dimension	Tolerance	Standard dimension	Tolerance	Standard dimension	Tolerance
PC1-6×4	18.0	±0.5	10.0	±0.3	10.0	±0.3	2.0	±0.2
PC1-6×5	14.0		13.5					
PC1-7×2	20.0		14.0		8.1		3.4	
PC1-7×3			12.0		8.9		3.0	
PC1-8×2.5			13.0		12.4			
PC1-8×4.5					12.0		3.2	
PC1-8×7					15.9		3.9	
PC1-9×4	9.8				3.2			
PC1-9×6.5	14.0		31.4		3.5			
PC1-10×4			15.3		5.5			
PC1-10×4.5			13.3		4.0			
PC1-10×7.5			17.3					

Type code	l_2 (before attachment)		l_5 (after attachment)		Attachment hole diameter d_3		Attachment panel thickness l_3	
	Standard dimension	Tolerance	Standard dimension	Tolerance	Standard dimension	Tolerance	Standard dimension	Tolerance
PC1-6×4	18.7	±1.5	18.7	±0.5	Φ6	±0.1	3.0-4.5	±0.1
PC1-6×5	18.5		12.8		4.5-6.0			
PC1-7×2	18.8		18.8		Φ7		1.5-2.5	
PC1-7×3	21.1		23.6				2.5-4.0	
PC1-8×2.5	21.2		21.2		Φ8		1.5-3.5	
PC1-8×4.5	21.8		15.3				3.5-5.5	
PC1-8×7	25.5		25.5				6.0-8.0	
PC1-9×4	16.9		16.9		Φ9		3.0-5.0	
PC1-9×6.5	43.9		34.9				6.0-7.0	
PC1-10×4	27.5		27.5		Φ10		3.5-4.0	
PC1-10×4.5	26.1		26.1				4.0-5.0	
PC1-10×7.5	31.0		31.0				7.0-8.0	

5.2.2 Ergonomic-compliant clips

The shapes and dimensions of the ergonomic-compliant clips shall be as shown in **Table 5**.

Table 5 Shapes and dimensions of ergonomic-compliant clips



Units: mm

Type code	d_1		d_2		l_1		l_4	
	Standard dimension	Tolerance	Standard dimension	Tolerance	Standard dimension	Tolerance	Standard dimension	Tolerance
PC1E-6×3.5	14.0	±0.3	13.5	±0.3	10.0	±0.3	2.7	±0.2
PC1E-9×5	22.0	±0.5	15.0		16.9	±0.5	3.5	
PC1E-9×5.5	33.0		14.0		29.3			
PC1E-9×6.5	18.0				31.4			
PC1E-10×4.5	26.0		18.0		17.3		3.6	

Type code	l_2 (before attachment)		l_5 (after attachment)		Attachment hole diameter d_3		Attachment panel thickness l_3	
	Standard dimension	Tolerance	Standard dimension	Tolerance	Standard dimension	Tolerance	Standard dimension	Tolerance
PC1E-6×3.5	18.5	±1.5	12.8	±0.5	Φ6	±0.1	2.5-4.5	±0.1
PC1E-9×5	26.3		24.6		Φ9		4.3-6.4	
PC1E-9×5.5	40.5		32.8				5.0-5.5	
PC1E-9×6.5	43.7		34.9				6.0-7.0	
PC1E-10×4.5	29.6		29.6		Φ10		3.5-5.5	

5.3 Material

Polyacetal (POM) shall be used as a clip material and satisfy the requirements specified in **Table 6**. The colour tone shall be black. Other information such as VOC shall be additional specifications.

Table 6 Characteristics of POM material

Item	Material characteristics	Test method
Tensile strength MPa	57 min.	As specified in JIS K7161 and JIS K7162 .
Tensile strain %	9 min.	As specified in JIS K7161 and JIS K7162 .
Charpy impact strength kJ/m	3 min.	As specified in JIS K7111-1 and JIS K7111-2 .
Loaded deflection temperature (0.46 MPa) °C	132 min.	As specified in JIS K7191-1 and JIS K7191-2 .
Formaldehyde content (VOC)	Shall be agreed among the parties concerned.	As specified in JIS M902 .

6 Test

6.1 Test conditions

6.1.1 Standard conditions of laboratory

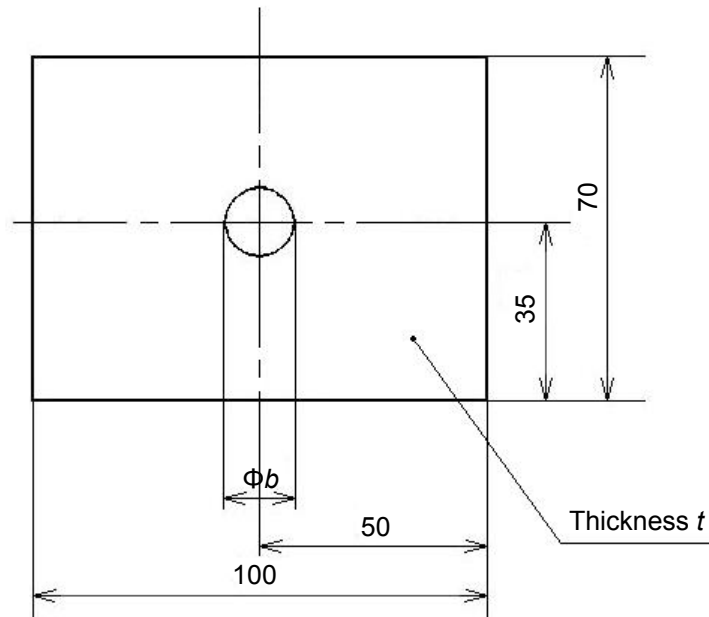
The standard conditions of the laboratory shall be at 23 ± 2 °C and 50 ± 10 RH% as specified in **JIS K7100**. If the standard conditions cannot be maintained, the actual temperature and humidity shall be noted.

6.1.2 Test steel plate

SPCC specified in **JIS G3141** shall be used for the test steel plate, and it shall have the shapes and dimensions shown in **Table 7**. The hole shall be pressed and coated. The coating thickness shall be 0.05 mm or less.

Table 7 Test steel plate

Units: mm



Attachment hole diameter	b	t	
		Standard dimension	Tolerance
$\Phi 6$	6.0 ± 0.05	0.7	± 0.05
$\Phi 7$	7.0 ± 0.05		
$\Phi 8$	8.0 ± 0.05		
$\Phi 9$	9.0 ± 0.05	1.0	
$\Phi 10$	10.0 ± 0.05		

6.1.3 Insertion direction of resin clip

The clip insertion direction shall be the punching direction of the hole.

6.2 Test method**6.2.1 Insertion force test**

This test shall be conducted to measure the maximum load when the clip is inserted into the hole on the test steel plate.

a) Measuring equipment

The measuring equipment that can measure compression load and tensile load shall be used. The accuracy shall be within ± 0.5 % of the full scale.

b) Operation

Fix the test steel plate, press-fit the measuring equipment to the resin clip, and insert the clip vertically into the test steel plate by applying load as shown in **Figure 3**.