

JIS

JAPANESE INDUSTRIAL STANDARD

**Cylinder head gaskets for
automobile engines**

JIS D 3105—1992

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Printed in Japan

In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

1. Scope

This Japanese Industrial Standard specifies cylinder head gaskets used for automobile engines, (hereafter referred to as gaskets).

Remarks: The applicable standard is as follows:

JIS D 1001-Engine Power Test Code for Road Vehicles

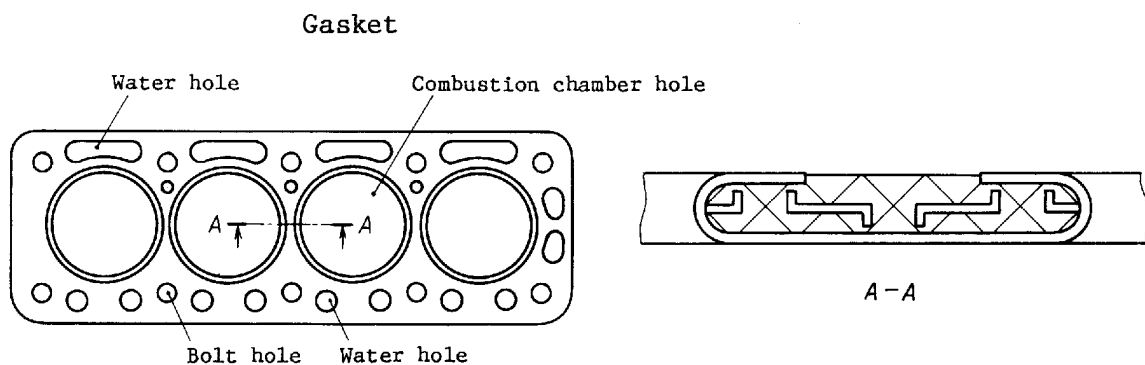
2. Definition

The meanings of the main terms used in this standard shall be as follows:

(1) Terms relating to gasket construction

- (a) cross-sectional construction of combustion chamber hole sealing part
The cross-sectional construction parts which seal mainly combustion gas at the combustion chamber hole part of the gasket. (Refer to Fig. 3).

Fig. 1. Cross-sectional construction of combustion chamber hole sealing part (Example)



- (b) combustion chamber hole sealing part reinforcing construction
The construction for reinforcing the combustion chamber hole sealing part of the gasket to particularly improve the sealing effect.
- (c) gasket (body) Gasket body from which the grommet and the auxiliary seal are removed.

- (d) grommet Metal ring which is independent of the gasket body and covers the surroundings of inside edge of the hole.
- (e) auxiliary seal Seal added for supplementing the sealing function of the gasket body.

(2) Terms relating to gasket material

- (a) joint sheet Dense sheet-form gasket material made by pressing with heat mixture of organic fiber, inorganic fiber or the mixture of them and rubber.
- (b) beater sheet Sheet-form gasket material made by the paper making process of organic fiber, inorganic fiber or the mixture of them as the main material and rubber latex or the like as the binder by means of a beater or the like.
- (c) graphite sheet Flexible soft sheet-form gasket material of laminated structure formed by expanding natural flake graphite as the main component.
- (d) metal core fiber sheet Sheet-form gasket material prepared by integrally laminating a non-metallic material such as joint sheet or beater sheet and a metallic material such as mild steel sheet.
- (e) metal core graphite sheet Sheet-form gasket material prepared by integrating a graphite sheet and a mild metal material.

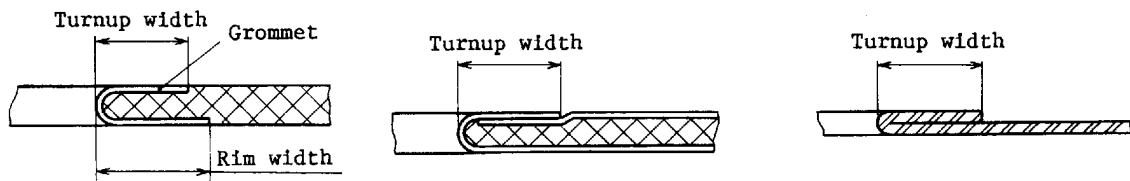
(3) Terms relating to measurement of gasket

- (a) free time thickness The thickness of gasket when produced means the thickness of the combustion chamber hole sealing part unless otherwise specified.
- (b) difference in free time thickness The difference between the maximum and the minimum values of free time thickness in one sheet of gasket.
- (c) tightened thickness The thickness of the gasket measured when it is tightened between the corresponding cylinder block and cylinder head under the specified tightening torque⁽¹⁾, means the thickness of the combustion chamber hole sealing part unless otherwise specified.

Note ⁽¹⁾ The torque specified by the agreement between the parties concerned with delivery or the manufacturers of engines.

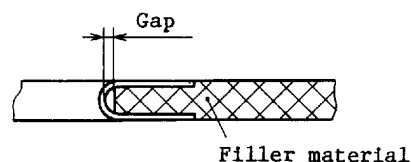
- (d) difference in tightened thickness The difference between the maximum and the minimum values of tightened thickness in one sheet of gasket.
- (e) turnup width The width of the gasket at those parts where the metal sheet is turned up at the hole parts and outer peripheral parts of gasket (refer to Fig. 2).

Fig. 2. Turnup width



- (f) rim width of grommet The width of the ring on the opposite side of the turned up side (refer to Fig. 2).
- (g) concentricity The quantity of deviation between the center of designed basis hole and that of the product hole (Refer to Fig. 4).
- (h) filling degree In a gasket with its combustion chamber hole sealing part covered with metal, the degree in which the filler material fills the inside of the metal (marked by the dimensions of the gap shown in Fig. 3).

Fig. 3. Filling degree



(4) Terms relating to test of gasket

- (a) pressure-sensitive sheet A test sheet which produces difference in developed color corresponding to the magnitude of the applied pressure, classified into the single coloration type which develops color by one sheet and the laminated coloration type which consists of a pair of coloration sheet (a sheet which indicates coloration) and a coloration initiating sheet (a sheet which encourages coloration).
- (b) interface leakage The leakage from the interfaces (gasket fitting surfaces) between the gasket and the cylinder block or cylinder head.
- (c) exudation leakage Leakage caused by exudation through the gasket.
- (d) measuring element of thickness A plastic material (lead alloy piece) used for measuring the condition of tightening of the gasket accurately when measuring its tightened thickness.

3. Classification

3.1 Classification by basic construction The types of gaskets classified by basic construction shall be as shown in Table 1.

Table 1. Classification by basic construction

Classification	Basic construction
Component type	Combustion chamber hole sealing part and the other parts are combined
Separate type	Combustion chamber hole sealing part and the other parts are not combined

3.2 Classification by body material The types of gaskets classified by body material shall be as shown in Table 2.

Table 2. Classification by body material

Classification	Body material
Metal type	Gasket body consisting of the metal only
Non-metal type	Gasket body consisting of the non-metal only
Combined type	Gasket body consisting of the combination of metal and non-metal

3.3 Classification by body construction The types of gaskets classified by the body construction shall be as shown in Table 3.

Table 3. Classification by body construction

Classification		Body construction
Single body structure		Structure made up with single material
Metal covered structure		Structure made up with a fiber compressed body or a non-fiber compressed body, covered with metal sheet
Metal core structure	Hook core type	Structure made up with a fiber compressed body having a core of hook type metal sheet, or combined structure made up with non-fiber compressed body together.
	Plate core type	Structure made up with a fiber compressed body having a core of plate type metal sheet, or combined structure made up with non-fiber compressed body together.
Metal laminated structure		Structure made up with laminated metal sheets

3.4 Classification by cross-sectional construction of combustion chamber hole sealing part The types classified by the cross-sectional construction of the combustion chamber hole sealing parts of the gasket shall be as shown in Table 4.

Table 4. Classification by cross-sectional construction of combustion chamber hole sealing part

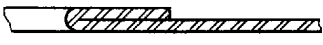
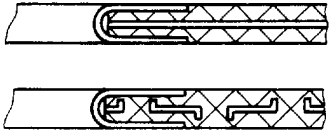
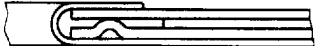
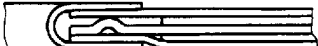
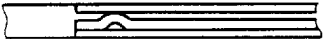
Classification		Corss-sectional construction	View of cross-sectional construction (example)
Single body construction	Flat type	Gasket consisting of a single metal sheet, having flat combustion chamber hole sealing part.	
	Grooved type	Gasket consisting of a single metal sheet, having a groove in the combustion chamber hole sealing part or in its vicinity.	
	Bead type	Gasket consisting of a single metal sheet, having a bead in the combustion chamber hole sealing part.	
	Bent back type	Gasket consisting of a single metal sheet which is bent back at the combustion chamber hole sealing part.	
Metal covered construction	Single turnup type	Covered type gasket in which the metal sheet on one side is turned up to cover the combustion chamber hole sealing part.	
	Double turnup type	Covered type gasket in which the metal sheets on both sides are turned up to cover the combustion chamber hole sealing part.	
	Grommet type	Covered type gasket in which the combustion chamber hole sealing part is covered with grommet.	

Table 4. (Cont'd)

Classification		Corss-sectional construction	View of cross-sectional construction (example)
Metal core construction	Grommet type	Gasket of the metal core construction in which the combustion chamber hole sealing part is covered with grommet.	
	Turnup type	Gasket consisting of a laminate of several thin metal sheets in which the top or the bottom sheet of the combustion chamber hole sealing part is turned up to cover it.	
Metal laminated construction	Grommet type	Gasket consisting of a laminate of several thin metal sheets in which the combustion chamber hole sealing part is covered with grommet.	
	Non-covered type	Gasket consisting of a laminate of several thin metal sheets in which the combustion chamber hole sealing part is not covered.	

3.5 Classification by reinforced construction of combustion chamber hole sealing part The types of gaskets classified by the reinforced construction of the combustion chamber hole sealing part shall be as shown in Table 5.