

JIS

JAPANESE INDUSTRIAL STANDARD

Testing methods for bearing strength of carbon fiber reinforced plastics

JIS K 7080—1991

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

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1. **Scope** This Japanese Industrial Standard specifies two testing methods for the bearing strength of carbon fiber reinforced plastics (hereafter referred to as the "CFRP"). One method (hereafter referred to as the "Method A") determines the bearing strength by measuring the tensile load at the time of 4 % deformation of the pin diameter. The other method (hereafter referred to as the "Method B") determines the bearing strength by solely measuring the maximum tensile load.

Remarks 1. In the case of measurement of the bearing strength of CFRP which shows striking anisotropy such as unidirectional laminates, the strength property of the matrix resin itself becomes dominant and therefore it shall be necessary to consider this respect.

2. Method A restrains the thickness direction of the test specimen around the pin hole, and it is a rigorous method for measuring the bearing strength at the time when the relative movement of the pin to the test specimen reaches 4 % of the pin diameter. Method B does not restrain a microscopic buckling of the test specimen to the thickness direction of the test specimen in the contact section with the pin, and the maximum tensile load shall be defined as the bearing strength. It is a simple and practical testing method dispensing with a jig having a complex structure.

3. The units and numerical values given in { } in this Standard are based on the traditional unit system and are appended for informative reference.

4. The standards cited in this Standard are as follows:

JIS B 1506-Rollers for Roller Bearings

JIS B 7184-Measuring Projectors

JIS B 7502-Micrometer Callipers for External Measurement

JIS B 7507-Vernier Callipers

JIS B 7509-Dial Gauges Reading in 0.001 mm

JIS K 6900-Glossary of Terms Used in Plastic Industry

JIS K 7072-Preparation of Carbon Fibre Reinforced Plastic
Panels for Test Purpose

JIS K 7100-Standard Atmospheres for Conditioning and Test-
ing of Plastics

JIS Z 8401-Rules for Rounding off of Numerical Values

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2. **Definitions** For the main terms used in this Standard the definitions in JIS K 6900 apply, and the rest of the terms shall be as follows:

- (1) **pinhole** A round hole provided on the test specimen for transmitting a tensile load using the steel pin.
 - (2) **pin diameter** The diameter of the pin.
 - (3) **edge distance** The distance from the centre of the pinhole to the edge of the test specimen.
 - (4) **edge distance to pin diameter ratio** The ratio of the edge distance to the pin diameter. (The edge distance divided by the pin diameter)
 - (5) **width to pin diameter ratio** The ratio of the width of the test specimen to the pin diameter. (The width of the test specimen divided by the pin diameter)
 - (6) **bearing stress** The applied tensile load divided by the product of the pin diameter and the thickness of the test specimen.
 - (7) **relative movement of pin** The relative movement of the pin to the test specimen in Method A (See Fig. 1).
 - (8) **bearing strength by Method A** The bearing stress at the time when the relative movement of the pin to the test specimen reaches 4 %⁽¹⁾ of the pin diameter.
- Note ⁽¹⁾ This value corresponds to the compressive strain at failure of epoxy resins, for instance.
- (9) **bearing strength by Method B** The bearing stress corresponding to the maximum tensile load.
 - (10) **yoke** The metal fitting used in Method A for the purpose of measuring the relative displacement of the pin, which is attached on both side of the edges of the test specimen along the horizontal extension line of the pin diameter.
 - (11) **collar** The round steel plate with a hole through the middle used in Method A for preventing a microscopic buckling occurring at the contact section between the pin and the test specimen.