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Estimation of tooth bending strength of cylindrical plastic gears

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Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Gear Manufacturers Association (JGMA)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS B 1759**:2013), which has been technically revised.

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Estimation of tooth bending strength of cylindrical plastic gears

1 Scope

This Japanese Industrial Standard stipulates the method for estimating the strength exhibited by plastic materials against bending fatigue breakage at the dedendum when they are used for cylindrical gears (hereafter referred to as the gears) that constitute a paralleled gear pair. No corresponding International Standard has been established at this point. Evaluation is made by obtaining the allowable bending stress of the gear materials based on results of an operation test of an external gear pair.

It also stipulates the safety evaluation methods using the nominal tangential forces assumed for gears made of plastic materials for which the allowable bending stress has already been obtained based on the evaluation method of this Standard. Safety evaluation is performed by comparing the dedendum bending stress obtained from the nominal tangential force and the allowable dedendum stress obtained from the allowable bending stress of the material. Safety evaluation can be applied to not only external gear pair but also to internal gear pair.

This Standard is applicable to plastic gears and steel gears having the specifications given in **a)** to **l)**, or to external gear pairs and internal gear pairs consisting only of plastic gears.

Items **j)** to **l)** are matters requring special attention.

a) Normal module : ≥ 0.5 mm and ≤ 2.0 mm

b) Reference diameter : ≤ 100 mm

c) Pressure angle : ≥ 14.5° and ≤ 25°

d) Helix angle : ≤ 25°

e) Transverse contact ratio : > 1.0 and < 2.0

f) Facewidth : ≤ 25 mm

g) Gear precision : conforming to the precision class stipulated by **JIS B 1702-3**

h) Tooth profile : in accordance with the provision in **JIS B 1701-1**; alternatively, other tooth profile [refer to **c)** above] than given in the said standard as for normal pressure angle or other dedendum fillet shapes than those created by the basic rack.

i) Others : gear pairs without any contact issues, which consist of gears without natural undercut or sharp tooth tip, and are assembled with a centre distance with no dedendum

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