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SAE J543 APR86

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Starting Motor Pinions and Ring Gears

SAE Standard
Reaffirmed April 1986

Submitted for Recognition as an American National Standard

This standard is indexed in the Standards Search Database

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RATIONALE:

Currently under revision by the Cranking Motor Subcommittee of the SAE Electrical & Electronic Systems Technical Committee.

RELATIONSHIP OF SAE STANDARD TO ISO STANDARD:

Not applicable.

REFERENCE SECTION:

Not applicable.

APPLICATION:

The tables and illustrations included in this SAE Standard are to be used as a guide in establishing starting motor pinions and ring gear designs. Consult the gear manufacturer for detail dimensions.

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HIGHWAY VEHICLE STANDARD

Submitted for recognition as an American National Standard

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STARTING MOTOR PINIONS AND RING GEARS

The following table and illustrations are to be used as a guide in establishing starting motor pinions and ring gear designs. Consult the gear manufacturer for detail dimensions.

1. RING GEAR DESIGN: Ring gears of 10/12 pitch and finer are normally not chamfered. Gears coarser than 10/12 pitch should be chamfered in accordance with Fig. 1.

2. RING GEAR AND PINION INSTALLATION: Backlash is necessary for free meshing and running of the pinion with the ring gear. Backlash may be obtained by increasing the center distance as shown in Fig. 2 or by reducing the tooth thickness.

3. RING GEAR HARDNESS: Hardness range for typical ring gears after assembly is:

   8/10 pitch and coarser Rockwell C45-52
   10/12 pitch and finer Rockwell C48-55

4. CENTER DISTANCE: The formula for calculating center distance (C.D.) is:

$$\text{C.D.} = \frac{\text{No. Ring Gear Teeth (Blank)}^{a} + \text{No. Pinion Teeth (Blank)}^{a}}{2 \times \text{Diametral Pitch}^{b}} + \Sigma C^{c}$$

   where:

   a = the number of teeth is equal to the number used to determine blank size. A blank is a disk or cylinder of such size as to relate to a standard gear of standard addendum, dedendum and given number of teeth. To increase tooth strength and improve cranking ratio, many pinion gears are cut on an oversize blank (example: 10 teeth on 11 tooth blank). In this example, 11 would be used for the number of pinion teeth in calculating center distance.

   b = for fractional diametral pitch (example: 8/10 pitch), use the numerator (8 in this example) for center distance calculation.

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4. Continued:

C = ↘C is the increase in center distance to obtain backlash. See Fig. 2. If backlash is obtained by reducing tooth thickness, omit ↘C from the C.D. formula.

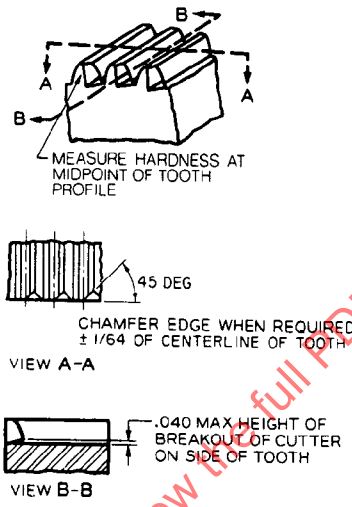

FIG. 1

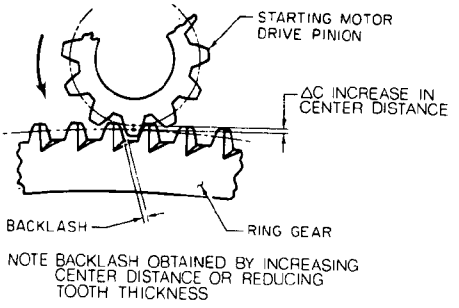

FIG. 2

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