AMERICAN GEAR MANUFACTURERS ASSOCIATION

Rating the Pitting Resistance and Bending Strength of Hypoid Gears

AGMA 932-A05

AGMA INFORMATION SHEET

(This Information Sheet is NOT an AGMA Standard)

American Gear Manufacturers Association

Rating the Pitting Resistance and Bending Strength of Hypoid Gears
AGMA 932–A05

Approved January 19, 2005

ABSTRACT

This information sheet provides a method by which different hypoid gear designs can be compared. The formulas are intended to establish a uniformly acceptable method for calculating the pitting resistance and bending strength capacity of both curved and skewed tooth hypoid gears. They apply equally to tapered depth and uniform depth teeth.

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Foreword

[The foreword, footnotes and annexes, if any, in this document are provided for informational purposes only and are not to be construed as a part of AGMA Information Sheet 932–A05, *Rating the Pitting Resistance and Bending Strength of Hypoid Gears.*]

The material present in AGMA 932–A05 was originally included in an annex of the draft for ANSI/AGMA 2003–B97. The intent was to have a proposed rating method that would complement the hypoid geometry presented in ANSI/AGMA 2005–C95. It was removed from ANSI/AGMA 2003–B97 during the ballot process to allow for its timely publication. The committee felt this material should be expanded and presented in a separate information sheet prior to standardization.

The first draft of AGMA 932–A05 was made in June, 2003. It was approved by the AGMA Technical Division Executive Committee in January, 2005.

Suggestions for improvement of this information sheet will be welcome. They should be sent to the American Gear Manufacturers Association, 500 Montgomery Street, Suite 350, Alexandria, Virginia 22314.

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American Gear Manufacturers Association –

Rating the Pitting Resistance and Bending Strength of Hypoid Gears

1 Scope

This information sheet provides a method for calculating the pitting resistance and bending strength of hypoid gears using the procedures of ANSI/AGMA 2003-B97.

1.1 Rating formulas

The knowledge and judgment required to evaluate the various rating factors come from years of accumulated experience in designing, manufacturing and operating gear units. Empirical factors given in this document are general in nature. AGMA application standards may use other empirical factors that are more closely suited to the particular field of application. This document is intended for use by the experienced gear designer, capable of selecting reasonable values for the factors. It is not intended for use by the engineering public at large.

1.2 Exceptions

The exceptions in clause 1.2 of ANSI/AGMA 2003-B97 apply for hypoid gears. Lengthwise sliding in hypoids reduces their efficiency. Torque losses between driving pinion and gear range from 2 to 15 percent depending on the offset, spiral angles, velocity and lubrication. The equations neglect efficiency. The user can adjust input or output to account for losses.

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of this information sheet. At the time of publication, the editions were valid. All publications are subject to revision, and the users of this document are encouraged to investigate the possibility of applying the most recent editions of the publications listed.

ANSI/AGMA 2003-B97, *Rating the Pitting Resistance and Bending Strength of Generated Straight Bevel, Zerol Bevel and Spiral Bevel Gear Teeth*

ANSI/AGMA 2005-D03, *Design Manual for Bevel Gears*

3 Nomenclature

The symbols used in this information sheet are shown in table 1.

NOTE: The symbols and terms contained in this document may vary from those used in other AGMA standards. Users of this information sheet should assure themselves that they are using these symbols and terms in the manner indicated herein.

System international (SI) units of measure are shown in parentheses in table 1 and in the text.

Equations are shown in two formats: the first is non-metric, the second is with SI units, constants and ISO symbols, designated by “M” in the equation number.

Example:

$$s_{wc} = \frac{s_{ac}\, C_L\, C_H}{S_H\, K_T\, C_R} \qquad (2)$$

$$\sigma_{HP} = \frac{\sigma_{H\ lim}\, Z_{NT}\, Z_W}{S_H\, K_\theta\, Z_Z} \qquad (2M)$$