American Gear Manufacturers Association

Technical Resources

ANSI/AGMA 2011-B14
(Revision of ANSI/AGMA 2011-A98)

American National Standard

Cylindrical Wormgearing Tolerance and Inspection Methods

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Approved October 3, 2014

ABSTRACT

This standard describes and defines variations that may occur in unassembled wormgearing. It displays measuring methods and practices, giving suitable warnings if a preferred probe cannot be used. The applicability of single or double flank composite testing is discussed, using a reference gear. Tooth thickness measurement is shown using direct measurement as well as the use of measurements over wires or pins. Equations for the maximum variations are given for the stated ranges, as a function of size, pitch and tolerance grade.

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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 ANSI/AGMA 2011-B14, *Cylindrical Wormgearing Tolerance and Inspection Methods.*]

The purpose of this standard is to establish geometrical accuracy communication between a manufacturer and purchaser of unassembled cylindrical wormgearing with axes at right angles.

AGMA 390.02 September 1964 was a replacement for AGMA 234.01 for fine pitch wormgearing. ANSI/AGMA 2000-A88 is a partial revision of AGMA 390.03, but does not cover wormgearing. AGMA 390.03a of 1988 still only covered fine pitch wormgearing. ANSI/AGMA 2011-A98 then is a replacement for AGMA 390.03a for fine pitch wormgearing. In addition, it also covers coarse pitch wormgearing.

The Cylindrical Wormgearing Committee began working on ANSI/AGMA 2011-A98 in August, 1993. At that time, it was determined the International Standards Organization's (ISO) method for tolerance grades would be used in this standard.

ANSI/AGMA 2011-A98 was approved by the AGMA membership in June, 1998 and approved as an American National standard on October 1, 1998.

The new ANSI/AGMA 2011-B14 was required to correct a typographical error found in equation 18 of ANSI/AGMA 2011-A98. The metric edition of the standard was not affected.

The first draft of ANSI/AGMA 2011-B14 was created in May 2013. It was approved by the membership in June 2014 and as an American National Standard on October 3, 2014.

Suggestions for improvement of this standard will be welcome. They may be submitted to tech@agma.org.

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American National Standard -

Cylindrical Wormgearing Tolerance and Inspection Methods

1 Scope

This standard establishes a classification system which may be used to communicate geometrical accuracy specifications of unassembled cylindrical wormgearing with axes at right angles. It also provides information on measuring methods and practices. This standard provides the gear manufacturer and the gear purchaser with a mutually advantageous reference for uniform tolerances and inspection procedures. Tolerance grades 3 through 12 are defined in this standard and are based on the relative effect of geometrical errors on conjugate action for wormgear sets acting as speed reducers.

1.1 Tolerance equations and tables

Tolerance equations are provided in clause 5 for calculating the maximum values allowed by the specific tolerance grade. Tables are provided in annex A for reference.

1.2 Measuring methods and practices

Measuring methods and practices are included in order to promote uniform inspection procedures (see clause 4). These methods permit the manufacturer and purchaser to conduct measuring procedures which are accurate and repeatable to a degree compatible with the specified tolerance grade.

1.3 Exceptions

This standard applies to individual worm and gear components. It does not establish a tolerance grade for enclosed drive assemblies. Establishing ratings based on tolerance grade is beyond the scope of this standard. Gear design and backlash are also beyond the scope of this standard. Refer to the latest AGMA Publications Catalog for applicable standards. This standard does not apply to worms with mean diameters larger than 16 inches, nor does it apply to wormgears with mean diameters larger than 100 inches. This standard does not apply to geometry finer than 0.063 axial pitch. This standard does not apply to spiral gears or any type other than cylindrical single enveloping wormgearing.

2 Symbols, terms and definitions

The symbols, terms and definitions used in this standard are, wherever possible, consistent with ANSI/AGMA 1012-G05 and other approved AGMA documents.

2.1 Symbols

Table 1 is a list of the symbols used in this standard, along with the associated terms. The “Where first used” column gives the clause or equation number where the particular symbol is first used.

2.2 Definition of terms

axial plane: The axial plane is the plane containing the line of axis of the worm. Diameters may be measured in this plane but thread surfaces would require a theoretical knife edge measurement. These measurements may be obtained by indirect means using normal plane measurements. The probe measurement in Method “A” will give a direct axial measurement, however, since the normal to probe center is repeated at each point.

