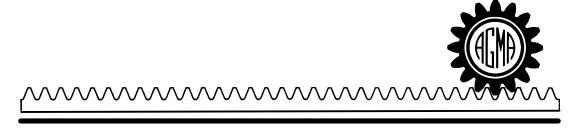
AGMA ISO 10064-5-A06

AGMA ISO 10064-5-A06 Identical to ISO/TR 10064-5:2005

AMERICAN GEAR MANUFACTURERS ASSOCIATION

Code of Inspection Practice - Part 5: Recommendations Relative to Evaluation of Gear Measuring Instruments



AGMA INFORMATION SHEET

(This Information Sheet is NOT an AGMA Standard)

American Gear Manufacturers Association

Code of Inspection Practice - Part 5: Recommendations Relative to Evaluation of Gear Measuring Instruments

AGMA ISO 10064-5-A06

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Approved July 18, 2006

ABSTRACT

This information sheet provides methods and examples to support the implementation of ANSI/AGMA ISO 18653–A06. It proposes evaluation and calibration procedures for involute, helix, runout, and tooth thickness measurement processes. Methods are given for the evaluation of condition and alignment of instrument elements such as centers, guideways, probe systems, etc. Guidance is given on the application of measurement processes to the inspection of product gears, including fitness for use and the recommended limits for U_{95} uncertainty based upon the accuracy tolerances of product gears to be inspected.

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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 ISO 10064-5-A06, Code of Inspection Practice - Part 5: Recommendations Relative to Evaluation of Gear Measuring Instruments.]

In 1988, The American Gear Manufacturers Association recognized the need for establishment of standards for the calibration of gear measuring instruments. The AGMA Calibration Committee was formed between April 1989 and their first meeting in February 1990. Between 1995 and 1999, this committee, as members of the Committee on Gear Metrology (COGM), was instrumental in the establishment of the Oak Ridge Gear Metrology Laboratory for the purpose of calibrating gear artifacts traceable to the National Institute for Standards and Technology.

The AGMA Calibration Committee, between 1990 and 1998, developed and published three national standards on calibration of gear measuring instruments: ANSI/AGMA 2110-A94, Measuring Instrument Calibration – Part I, Involute Measurement, ANSI/AGMA 2113-A97, Measuring Instrument Calibration, Gear Tooth Alignment Measurement, and ANSI/AGMA 2114-A98, Measuring Instrument Calibration, Gear Pitch and Runout Measurements.

These standards covered elemental measurements specified in the accuracy requirements of ANSI/AGMA 2015–1–A01, Accuracy Classification System – Tangential Measurements for Cylindrical Gears.

In 1999, the content of these standards was combined and submitted to ISO as a proposed work item. As a result, ISO TC60/WG2 used this as the basis for development of ISO 18653:2003, Gears – Evaluation of instruments for the measurement of gears, and ISO/TR 10064–5:2005, Code of inspection practice – Part 5: Recommendations relative to evaluation of gear measuring instruments.

During the ISO development period the Calibration Committee decided that supplemental information, on measurement system conditions for calibration, accuracy requirements and uncertainty determination, was desirable to have in an AGMA Information Sheet. This resulted in the publication of AGMA 931–A02, *Calibration of Gear Measuring Instruments and Their Application to the Inspection of Product Gears*, in 2002.

The ISO documents expanded the AGMA work and included material on the determination of uncertainty of measurement and the introduction of spherical calibration artifacts. The natural evolution, therefore, was the adoption of the two comprehensive ISO documents as national documents in place of the four AGMA documents.

AGMA ISO 10064-5-A06 replaces AGMA 931-A02, also the instrument set-up and measurement recommendations contained within ANSI/AGMA 2010-A94, ANSI/AGMA 2110-A94, ANSI/AGMA 2113-A97, and ANSI/AGMA 2114-A98. The requirements for instrument calibration can be found in ANSI/AGMA ISO 18653-A06.

This information sheet is an identical adoption of ISO/TR 10064-5:2005.

The first draft of AGMA ISO 10064-5-A06 was made in October 2005. It was approved by the AGMA membership in July 2006.

Suggestions for improvement of this standard 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 National Standard -

Code of Inspection
Practice - Part 5:
Recommendations
Relative to Evaluation of
Gear Measuring
Instruments

1 Scope

This information sheet provides additional information and examples to support the implementation of ANSI/AGMA ISO18653. It provides evaluation and calibration procedures for involute, helix, pitch, runout, and tooth thickness measurement processes.

Methods are provided for evaluation of the condition and alignment of instrument elements such as centers, guide ways, probe systems, etc. Recommendations are included for establishment of a proper environment and for statistical data evaluation procedures.

It also covers the application of gear artifacts to the estimation of U_{95} measurement process uncertainty. Guidance on the application of measurement processes to the inspection of product gears is provided, including fitness for use and the recommended limits for U_{95} uncertainty based upon the accuracy tolerances of product gears to be inspected.

Many of its recommendations may also be applicable to the measurement of worms, worm wheels, bevel gears and gear cutting tools.

2 References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ANSI/AGMA ISO 18653-A06, Gears - Evaluation of instruments for the measurement of gears

ISO 1122-1:1998, Glossary of gears - Geometrical definitions

ISO1328-1:1995, Cylindrical gears - ISO system of accuracy - Part 1: Definitions and allowable values of deviations relevant to corresponding flanks of gear teeth

ISO1328-2:1997, Cylindrical gears - ISO system of accuracy - Part 2: Definitions and allowable values of deviations relevant to radial composite deviation and runout information

ISO/TR 10064-1:1995, Code of inspection practice - Part 1: Inspection of corresponding flanks of gear teeth;

ISO/TR 10064-2:1996, Code of inspection practice - Part 2: Inspection related to radial composite deviations, runout, tooth thickness and backlash

ISO/TR 10064-3:1996, Code of inspection practice - Part 2:Recommendations relative to gear blanks, shaft center distance and parallelism of axes

ISO 10360-1:2000, Geometrical Product Specifications (GPS) - Acceptance and reverification tests for coordinate measuring machines (CMM) - Part 1: Vocabulary

ISO 14253-1:1998, Geometrical Product Specifications (GPS) - Inspection by measurement of workpieces and measuring equipment - Part 1: Decision rules for proving conformance or non-conformance with specifications

ISO/TS 14253-2:1999, Geometrical product specifications (GPS) - Inspection by measurement of workpieces and measuring equipment - Part 2 Guide to the estimation of uncertainty in GPS measurement, in calibration of measuring equipment and in product verification

Guide to the expression of uncertainty in measurement (GUM), BIPM, IEC, IFCC, ISO, IUPAC, IUPAP, OIML 1st edition 1993, corrected and reprinted in 1995