AMERICAN GEAR MANUFACTURERS ASSOCIATION

Recommendations Relative to the Evaluation of Radial Composite Gear Double Flank Testers

AGMA 935-A05

AGMA INFORMATION SHEET

(This Information Sheet is NOT an AGMA Standard)

American National Standard

Recommendations Relative to the Evaluation of Radial Composite Gear Double Flank Testers
AGMA 935–A05

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[Tables or other self–supporting sections may be referenced. Citations should read: See AGMA 935–A05, *Recommendations Relative to the Evaluation of Radial Composite Gear Double Flank Testers,* published by the American Gear Manufacturers Association, 500 Montgomery Street, Suite 350, Alexandria, Virginia 22314, http://www.agma.org.]

Approved October 16, 2005

ABSTRACT

The condition and alignment of gear measuring instruments can greatly influence the measurement of product gears. This information sheet provides guidelines for the alignment of double flank tester elements such as centers, ways, probe systems, etc. It also covers the application of artifacts to determine instrument accuracy.

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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 935–A05, *Recommendations Relative to the Evaluation of Radial Composite Gear Double Flank Testers.*]

Between 1994 and 1998, AGMA published three standards on calibration of gear measuring instruments: ANSI/AGMA 2010–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*. The Calibration Committee decided that supplemental information, on measurement system conditions for calibration, accuracy requirements and uncertainty determination, was desirable to have in an Information Sheet, AGMA 931–A02, *Calibration of Gear Measuring Instruments and Their Application to the Inspection of Product Gears* that was published in 2002.

The material in these AGMA documents were combined and submitted to ISO for the development of ISO 18653:2003, *Gears – Evaluation of instruments for the measurement of gears,* and ISO/TR 10064–5:2005, *Cylindrical gears – Code of inspection practice – Part 5: Recommendations relative to evaluation of gear measuring instruments.*

The Calibration Committee decided that the similar standardization and information was needed for the evaluation methods of double flank testers used for (radial) composite measurement of gears. After a study of existing practices, standards, and literature the information contained herein is a consolidation of the most common practices currently in existence.

The first draft of AGMA 935–A05 was made in August, 2003. It was approved by the AGMA Technical Division Executive Committee in October, 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 National Standard –

Recommendations Relative to the Evaluation of Radial Composite Gear Double Flank Testers

1 Scope

This information sheet provides qualification procedures for double flank testers that are used for the evaluation of radial composite deviations of gears. Recommendations are included for establishment of a proper environment. Suggested artifact criteria and analysis procedures are also provided.

2 References

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

AGMA 915-2-A05, *Inspection Practices - Part 2: Cylindrical Gears - Radial Measurements*

ANSI B89.6.2:2003, *Temperature and Humidity Environment for Dimensional Measurement*

ANSI/AGMA 1012-G05, *Gear Nomenclature, Definitions of Terms with Symbols*

ANSI/AGMA 2015-1-A01, *Accuracy Classification System - Tangential Measurements for Cylindrical Gears*

AGMA 2015-2-AXX[1)], *Accuracy Classification System - Radial Measurements for Cylindrical Gears*

ANSI/AGMA 2116-A05, *Evaluation of Double Flank Testers for Radial Composite Measurement of Gears*

ISO 1122-1:1998, *Vocabulary of gear terms - Part 1: Definitions related to geometry*

ISO 18653:2003, *Gears -- Evaluation of instruments for the measurement of individual gears*

ISO/TR 10064-5:2005, *Code of inspection practice - Part 5: Recommendations relative to evaluation of gear measuring instruments*

3 Definition of terms

The symbols used in this document are shown in table 1.

Table 1 - Symbols

Symbol	Term	Units
F_a	Active face width (width of the narrower member in the mesh)	mm
F_{id}	Total radial composite deviation	µm
f_{id}	Tooth-to-tooth radial composite deviation	µm
L	Active length of set-up parts (arbors, pitch discs, blocks, etc.)	mm
s_a	Apparent functional tooth thickness	mm
s_f	Functional tooth thickness	mm
U_{95}	Uncertainty of measurement	µm
ΔC	Allowable center distance variation	mm
ϕ	Pressure angle	degrees
θ_a	Misalignment in the axial plane (non-parallelism)	mm/mm
θ_P	Misalignment in the pitch plane (cross axis)	mm/mm

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

[1)] presently at the stage of development