



American  
Gear Manufacturers  
Association

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Technical Resources

Revision of ANSI/AGMA 6000-A88  
Reaffirmed January 2010

## **American National Standard**

# **Specification for Measurement of Linear Vibration on Gear Units**

# American National Standard

## ***Specification for Measurement of Linear Vibration on Gear Units***

ANSI/AGMA 6000-B96

[Revision of ANSI/AGMA 6000-A88]

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Approved September 6, 1996

### **ABSTRACT**

This standard presents a method for the measurement of linear vibrations on a gear unit. Instrumentation, measuring methods, test procedures and discrete frequency vibration limits are recommended for acceptance testing. An annex which lists system effects on gear unit vibration and responsibility is also provided.

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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 Standard 6000–B96, *Specification for Measurement of Linear Vibration on Gear Units*.]

ANSI/AGMA 6000–A88 included and superseded the information previously published in AGMA 426.01 (1972), *Specification for Measurement of Lateral Vibration on High Speed Helical and Herringbone Gear Units*.

Performance of driven equipment is dependent upon the individual characteristics of the prime mover, gear unit, driven machine and support structure, as well as their combined effects as a system. The proper assessment of performance characteristics is essential for realistic evaluation. The knowledge and judgment required to properly evaluate the gear unit vibration comes primarily from years of accumulated experience in designing, manufacturing, and operating gear units. For these reasons, the use of this standard and the evaluation of test results for specific gear product applications should only be attempted by experienced personnel.

The complexity of gear vibration phenomena makes most vibration standards difficult to apply or to properly interpret. The AGMA Acoustical Technology Committee developed the *Specification for Measurement of Linear Vibration on Gear Units* to provide a common basis for communication between project engineers, gear manufacturers, and users. The purpose was, also, to encourage the maximum practical degree of uniformity and consistency among vibration measurement practices within the gear industry.

Because of the wide variation of gear driven systems and structural supports, ANSI/AGMA 6000–A88 identified certain areas where special considerations might be necessary and must be agreed upon between purchaser and gear manufacturer when discussing gear vibrations.

ANSI/AGMA 6000–A88 was approved as a standard by the AGMA membership in May 1988 and approved as an American National Standard on June 16, 1988.

ANSI/AGMA 6000–B96 is a revision of ANSI/AGMA 6000–A88. The revision includes clarification of application of the standard, changes to annex A, and the addition of a new annex C, from ISO 8579-2.

ANSI/AGMA 6000–B96 was approved as a standard by the AGMA membership in June 1996, and approved as an American National Standard on September 6, 1996.

Suggestions for improvement of this standard will be welcome. They should be sent to the American Gear Manufacturers Association, 1500 King Street, Suite 201, Alexandria, Virginia 22314.

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# American National Standard – Specification for Measurement of Linear Vibration on Gear Units

## 1 Scope

This standard presents a method for measuring steady state filtered linear vibrations of a gear unit. Types of instrumentation, measurement methods, and testing procedures for the determination of linear vibration levels for specific types of gear units are provided. Vibration limits at discrete frequencies are recommended for acceptance testing. It is not the intent of this standard to provide unfiltered limits.

The recommended limits and conditions specified herein are intended as the vibration criteria for performance of the gear drive during the equipment manufacturer's test when specifically agreed to by the manufacturer and purchaser.

This standard is specifically applicable to enclosed speed reducing or increasing gear drive units designed, rated, and lubricated in accordance with ANSI/AGMA product standards as indicated in 4.3.

This standard does not apply to integrated systems, shaft-mounted units, special or auxiliary drive trains or power take-off gears. Vibration amplitudes exceeding the recommendations of this specification for drives with flexible housings or on flexible supports may also be allowable if accounted for in the design. Acceptable limits for this type of equipment should be independently specified. However, if negotiated, this standard may be applied to such equipment.

Torsional and transient vibrations of a geared system are not included in this standard.

**NOTE:** Compliance with this standard does not constitute a warranty of the measured gear unit's performance under installed field service conditions.

Five annexes are for reference only and are not a part of this standard.

Annex A illustrates the relationship between vibratory displacement, velocity and acceleration waveforms.

Annex B discusses systems effects and responsibility.

Annex C presents five classes of gear unit vibration rating and a subjective procedure for selecting the proper rating based on the application and transmitted power.

Annex D gives the conversion of metric, SI units to non-metric (inch) units.

Annex E contains a bibliography.

## 2 References

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ANSI-S2.2-1959 (R1990), *Methods for the Calibration of Shock and Vibration Pickups*

ANSI-S2.4-1976 (R1990), *Methods for Specifying the Characteristics of Auxiliary Analog Equipment for Shock and Vibration Measurements*

ANSI-S2.10-1971 (R1990), *Method for Analysis and Presentation of Shock and Vibration Data*

ANSI-Z24.21-1954 (R1989), *Specifying the Characteristics of Pickups for Shock and Vibration Measurements*

ISO 1925:1990, *Mechanical vibration - Balancing - Vocabulary*

ISO 2041:1990, *Vibration and shock - Vocabulary*

ISO 2954:1975, *Mechanical vibration of rotating and reciprocating machinery - Requirements for instruments for measuring vibration severity*