American Gear Manufacturers Association

ANSI/AGMA 6025-E19
Revision of ANSI/AGMA 6025-D98

American National Standard

Sound for Enclosed Helical, Herringbone and Spiral Bevel Gear Drives

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ABSTRACT

The standard describes a recommended method of acceptance testing and reporting of the sound power or sound pressure levels generated by a gear unit when tested at the manufacturer's facility. The results obtained should represent only the sound of the gear unit. Other systems influenced such as the prime mover or driven equipment are minimized. The purchaser should not expect to translate the manufacturer's test results directly to the system installation because of differences in environment, mounting and system effects.

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Contents

Annexes

Tables

Figures

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 6025-E19, *Sound for Enclosed Helical, Herringbone and Spiral Bevel Gear Drives*.]

Concern with industrial noise created a need for acoustical standards covering all types of gear products. Noise measurement and control is dependent upon the individual characteristics of the prime mover, gear unit and driven machine as well as their combined effects as a system in addition to the effects of the acoustic environment.

The complexity makes most sound standards difficult to apply or interpret properly. The AGMA Acoustical Technology Committee, now known as the Sound and Vibration Committee, developed this standard for the purpose of providing improved communication between purchaser, gear manufacturer and user in the areas of sound instrumentation, sound measurements and test procedures.

Because of the many variations of system response in different acoustic environments, this standard identifies certain areas where special test conditions might be necessary and should be part of the contractual agreement between purchaser and gear manufacturer.

The first draft of ANSI/AGMA 6025-C90 was prepared in January 1989 as a revision of AGMA 297.02. AGMA 297.01 was first approved by the AGMA membership in July of 1973. The standard presented the A-weighted sound pressure level measurement procedures for enclosed helical, herringbone and spiral bevel gear drives. Work began on a revision of AGMA 297.01 in 1979 to update the terminology and to add an appendix, a procedure for sound power measurements. AGMA 297.02 was approved for printing and distribution in 1983. This revision of AGMA 297.02 also incorporates AGMA 295.04 and AGMA 298.01, which were similar in content.

ANSI/AGMA 6025-C90 was approved by the AGMA membership and the American National Standards Institute in 1990. This revision of the 1990 standard is a modification incorporating the procedures from ISO 8579-1:1993 as a normative annex, updating of references and including additional information.

There are four annexes in this standard. Annex A is normative and is considered part of this standard when specified; Annexes B, C and D are informative and are not considered part of this standard.

ANSI/AGMA 6025-E19 updates sound measurement to include the sound power measurement method as an alternative to sound pressure measurement. The new standard contains the following revisions:

- Sound power calculations have been updated to be more consistent with ISO 3744.
- Annex A in ANSI/AGMA 6025-D98, which covered the sound power method, has been incorporated into the main body of this revision.
- Annex B in ANSI/AGMA 6025-D98 has been removed because it was obsolete.
- Example calculations have been added to demonstrate how to determine the environmental correction factor (K_2) and sound power as the new Annex A.
- Example calculations have been added to demonstrate how to determine sound power as the new Annex B.

ANSI/AGMA 6025-E19 was approved by the AGMA membership in December 2018. It was approved as an American National Standard on January 18, 2019.

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

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1 Scope

This standard describes the instrumentation, measuring methods and test procedures necessary for the determination of a gear unit's sound power and sound pressure levels for acceptance testing.

Sound power level is independent of the environment and the sound power levels of multiple sound sources can be added (energy addition). Sound pressure levels change depending on the environment but are useful for relative comparisons. Sound pressure has been used historically because it is less complex. The current availability of data acquisition equipment and computers, which make calculations trivial, has increased the popularity of sound power. Sound power requires the use of multiple microphones and post processing, whereas sound pressure is a direct measurement.

Other standards refer to this standard without specifying sound pressure or sound power. Historically, if unspecified, sound pressure was the measurement used over sound power. Municipal ordinances, standards, or build specifications may give some direction in the selection of the parameter. This standard provides instruction for using either method, and the user of this standard shall specify whether the measurement is sound power or sound pressure.

1.1 Sound Measurement

Sound pressure and sound power utilize the decibel, dB, as the unit of measurement. To avoid confusion, a distinction between the two is necessary.

Sound power is a measurement of the energy level emitted from a sound source. It is a constant value throughout the measured space regardless of distance. Special acoustical equipment may be required. Results are referred to as sound power level (SWL), L_W.

Sound pressure is a measurement of the change in the atmospheric pressure whose measured value diminishes as distance from the source increases. A simple sound meter is all that is required. Results are referred to as sound pressure level (SPL), L_p. It is imperative to specify whether sound power or sound pressure is being used.

1.2 Application

This standard is applicable to gear drives designed and rated in accordance with the following standards ANSI/AGMA 6011-J14, *Practice for High Speed Helical and Herringbone Gear Units* and ANSI/AGMA 6113-B16, *Standard for Industrial Enclosed Gear Drives (Metric Edition)*.

ANSI/AGMA 6025-E19 applies to only those gear units which are lubricated in accordance with manufacturer's recommendations and tested in a system of connected rotating parts free from serious critical speeds, torsional vibrations or overloads as tested at the gear unit manufacturer's facility.

Where performance of actual shop tests to determine sound level is required, it shall be the responsibility of the purchaser to so state in their inquiry and order.

NOTE: The gear unit is only part of the total acoustic system which includes, in addition to the gear unit, the prime mover, driven equipment, gear unit mounting, foundation and acoustic environment. Each of these might affect the measured level of sound emitted from the gear unit.

Special contractual considerations are discussed in Annex D.

CAUTION: Compliance with this standard does not constitute a warranty of the measured gear unit sound levels under installed field service conditions.

