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Association

Technical Resources

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American National Standard

Practice for Enclosed Cylindrical Wormgear Speed Reducers and Gearmotors

Practice for Enclosed Cylindrical Wormgear Speed Reducers and Gearmotors AGMA 6034-B92 (Revision of 6034-A87)

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ABSTRACT

This standard gives a method for rating and design of specific enclosed cylindrical wormgear reducers and gearmotors at speeds not greater than 3600 rpm or mesh sliding velocities not more than 6000 ft/min (30 m/s). It contains power, torque and efficiency equations with guidance on component design, thermal capacity, service factor selection, lubrication, and self-locking features of wormgears. Annexes are supplied on service factors and user recommendations.

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Foreword

[The foreword, footnotes, and annexes, are provided for informational purposes only and should not be construed as a part of American Gear Manufacturers Association 6034-B92, *Practice for Enclosed Cylindrical Wormgear Speed Reducers and Gearmotors*.]

The purpose of this document is to provide rating and general design specifications for enclosed speed reducers incorporating cylindrical wormgearing in single or multiple reductions. It covers types of speed reducer designs most commonly made by a number of manufacturers.

The formulas presented in this standard contain terms whose individual values can vary significantly depending on application, system effects, accuracy, and manufacturing method. Proper evaluation of these terms is essential for realistic rating. The knowledge and judgment required to properly evaluate the various rating factors come primarily from years of accumulated experience in designing, testing, manufacturing, and operating similar gear units. The detailed treatment of the general rating formulas for specific product applications is best accomplished by those experienced in the field.

AGMA 6034-A87 was a revision of AGMA 440.04 - 1971, and in addition contained information for cylindrical wormgear hollow output shaft speed reducers and for cylindrical wormgear gearmotors previously contained in AGMA 442.01 - 1965 and 461.01 - 1966. These two standards have been withdrawn.

AGMA 6034-A87 power rating formulas were unchanged from those provided in the now withdrawn AGMA 440.04 - 1971.

Service factors which appeared in AGMA 440.04 and 461.01 were revised and placed in the annex rather than the body of AGMA 6034-A87. These factors for modification of basic power ratings have been determined through experience, and are intended as a guide. Suggested service factors for various applications were shown in Appendix A of AGMA 6034-A87 as an additional aid.

A draft of AGMA 6034-A87 was made in October 1982, and that version was approved by the AGMA membership in October 1987. In March 1988 it was approved as an American National Standard.

AGMA 6034-B92 is a revision of AGMA 6034-A87 which updates lubricant recommendations, removes bronze specifications by referring to AGMA 2004-B89, *Gear Materials and Heat Treatment Manual*, and includes other minor editorial changes.

AGMA 6034-B92 was approved as a revision by the AGMA membership in October, 1991.

Suggestions for the 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 - Practice for Enclosed Cylindrical Wormgear Speed Reducers and Gearmotors

1 Scope

1.1 Applicability

This standard applies to the rating and design of enclosed cylindrical wormgear speed reducers and gearmotors having either solid or hollow output shafts and single or multiple reductions, including other types of gearing used in conjunction with cylindrical wormgearing. The rating and design considerations contained in this standard are valid for rotational speeds not greater than 3600 rpm and sliding velocities at the mesh of not more than 6000 ft/min (30 m/s).

The knowledge and judgment required to evaluate the various rating factors come from years of accumulated experience in designing, manufacturing, and operating gear units. Empirical factors given in this standard are suited to the particular use shown. This standard is intended for use by the experienced gear designer, capable of selecting reasonable values for the factors. It is not intended for use by the "engineering public at large."

No limitation is placed on the method of producing the worms and gears, but the tooth form of the gear must be conjugate to the thread form of the worm. See AGMA 341.02, *Design of General Industrial Coarse-Pitch Cylindrical Worm Gearing*.

1.2 Exceptions

This standard does not apply to cylindrical wormgear reducers which are designed or used as speed increasers.

This standard covers only the pitting resistance and wear rating of wormgearing, and does not cover any strength rating method.

1.3 System considerations

This standard does not attempt to address complete drive systems, torsional vibration, critical speeds, or other types of vibrations which may affect operation of enclosed cylindrical worm gear reducers.

1.4 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.

AGMA 250.04 - 1981, *Specification - Lubrication of Industrial Enclosed Gear Drives*

AGMA 341.02 - 1970, *Design of General Industrial Coarse-Pitch Cylindrical Worm Gearing*

ANSI/AGMA 2004-B89, *Gear Materials and Heat Treatment Manual*

ANSI/AGMA 6001-C88, *Design and Selection of Components for Enclosed Gear Drives*

ANSI/AGMA 6010-E88, *Standard for Spur, Helical, Herringbone and Bevel Enclosed Drives*

2 Symbols and terminology

The terms used, wherever applicable, conform to the following standards:

ANSI Y10.3 - 1968, *Letter Symbols for Quantities Used in Mechanics of Solids*

ANSI/AGMA 1012-F90, *Gear Nomenclature, Definitions of Terms with Symbols*

AGMA 904-B89, *Metric Usage*

NOTE - The symbols and terminology used in this standard may differ from other AGMA Standards. The user should not assume that familiar symbols can be used without careful study of table 1.

SI (metric) units of measure are shown in parentheses in table 1 and in the text. Where equations require a different format or constant for