American
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Technical Resources

Revision of
ANSI/AGMA 9000-C90

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American National Standard

Flexible Couplings – Potential Unbalance Classification

ANSI/AGMA 9000-D11

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ANSI/AGMA 9000–D11
[Revision of ANSI/AGMA 9000–C90]

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Approved August 10, 2011

ABSTRACT

This standard describes potential coupling unbalance and identifies its sources. The standard breaks down the requirements into usable groups and outlines how to calculate the potential unbalance of the coupling. The AGMA method of computing coupling potential unbalance is provided. A guide is provided for balance class selection for purchasers who have not defined the coupling balancing requirements for their system.

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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 9000–D11, *Flexible Couplings – Potential Unbalance Classification.*]

This standard was developed after intensive study of existing standards, literature, design practices, and manufacturing procedures for the balancing of flexible couplings. The intent of this document is to offer designers, manufacturers and users standard criteria for the unbalance classification of flexible couplings.

The information contained within this standard does not necessarily agree with some existing specifications for other rotating components and equipment. This standard is based upon the design criteria, related to the balancing of couplings, that have evolved over many years of successful industry practice.

At first, the coupling industry informally adopted, by usage, one tenth ounce–inch as a standard of unbalance tolerance. It soon became evident that for larger couplings this was an impractical tolerance. It also became evident that the runout of the balancing arbor as well as its own unbalance were very important factors in the final potential unbalance remaining in the corrected coupling. These facts were pointed out in Paper AGMA 519.01, October, 1967, the first AGMA technical paper written on the subject of flexible couplings. Shortly after the publication of this paper, Product Group 5 asked the Technical Committee to write an AGMA balancing standard for flexible couplings. It was recognized that existing balancing specifications such as MIL–STD 167 (ships) and ISO 1940 did not address flexible couplings.

AGMA 515.01 was intended as a guide to coupling users. The first rough draft of this standard was made in October of 1968. The first committee draft was prepared in February of 1972. It was approved by the membership on July 9, 1973.

AGMA 515.02 was a revision of AGMA 515.01. It was reviewed by the members of the Flexible Couplings Product Group 5 in January, 1974 and was revised in January, 1975 and again in September, 1975. It was approved by the membership on August 18, 1976.

ANSI/AGMA 9000–C90 was a revision and redesignation of AGMA 515.02. In the revision there were changes and corrections in the method of calculating the total potential unbalance of couplings (including the effects of hardware and eccentricity). The calculations gave a more accurate value of the potential unbalance of a coupling. The examples in the appendices were revised to show a generic coupling which illustrates the calculation methods presented. It was approved by the AGMA membership in November 1989, and was adopted as a National Standard on February 28, 1990.

ANSI/AGMA 9000–D11 is a revision of ANSI/AGMA 9000–C90. This revision introduces the use of ANSI S2–1999 or ISO 1940–1:2003 for the specification of balance quality grades for components or assemblies and how to properly apply that information to flexible coupling potential unbalance. It also contains numerous annexes for generic general purpose and high performance couplings. These annexes show how to apply the calculation methods of this standard for both component and assembly balancing of flexible couplings. Each annex also contains a discussion section and a section on the "value of the balance grade" which explains why a better balance grade may not result in a better balanced coupling assembly.

The first draft of ANSI/AGMA 9000–D11 was made in October, 2005. It was approved by the AGMA membership in April, 2011. It was approved as an American National Standard on August 10, 2011.

Suggestions for improvement of this standard will be welcome. They should be sent to the American Gear Manufacturers Association, 1001 N. Fairfax Street, 5th Floor, Alexandria, Virginia 22314.

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American National Standard –

Flexible Couplings – Potential Unbalance Classification

1 Scope

This standard defines classes of flexible coupling potential unbalance, one of which the user must select in order to meet the needs of their system. The classes are established using weight and speed and system sensitivity to arrive at a mass displacement value that defines the potential unbalance. The standard defines types of unbalance, provides a method of selecting balance class, identifies contributors to potential unbalance, and provides a method of determining potential coupling unbalance. The balance classes are derived from consideration of the potential unbalance of the coupling.

The balancing requirements for a flexible coupling depend upon the rotating system into which it is mounted. Each half of the coupling is mounted on a separate rotor with the whole coupling providing the connection. Each of the connected rotors is balanced independently of the coupling and the coupling is added when the rotors are installed.

This standard is used with ANSI S2.19–1999 or ISO 1940–1:2003 which apply to balance quality requirements of rigid rotors. If ANSI S2.19–1999 or ISO 1940–1:2003 is used for balancing coupling components and assemblies in the balancing machine, then potential unbalances are introduced after the coupling is disassembled and reassembled either in the balancing machine or the rotor system. These potential unbalances are primarily the result of:

- balancing mounting fixture inaccuracies;
- displacement of coupling components with respect to the axis of rotation of the rotor system during disassembly and reassembly of the coupling.

1.1 Application

This standard is applicable to couplings and addresses potential unbalance which could be expected of a coupling in service. This standard accounts for issues of runout and clearances in the calculation of potential unbalance and resulting balance class. It should be noted that a flexible coupling is generally an assembly of several components having diametral clearance and eccentricities between the pilot surfaces. ANSI S2.19–1999 (ISO 1940–1:2003) addresses residual unbalance as measured in the balancing machine. For an example, see annex K.

1.2 Exclusions

This standard does not take into account arbitrary balance standards developed by other standards organizations (e.g., American Petroleum Institute). In addition, this standard does not address the unbalance effects caused by:

- shaft runout;
- keys that protrude beyond the hub or shaft;
- unfilled keyways or keyseats;

