



American
Gear Manufacturers
Association

Technical Resources

Reaffirmed December 2004

American National Standard

Specifications for Powder Metallurgy Gears

ANSI/AGMA 6008-A98

American National Standard

Specifications for Powder Metallurgy Gears

ANSI/AGMA 6008-A98

Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing or using products, processes or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretation of this standard should be addressed to the American Gear Manufacturers Association.

CAUTION NOTICE: AGMA technical publications are subject to constant improvement, revision or withdrawal as dictated by experience. Any person who refers to any AGMA technical publication should be sure that the publication is the latest available from the Association on the subject matter.

[Tables or other self-supporting sections may be quoted or extracted. Credit lines should read: Extracted from ANSI/AGMA 6008-A98, *Specifications for Powder Metallurgy Gears*, with the permission of the publisher, the American Gear Manufacturers Association, 1500 King Street, Suite 201, Alexandria, Virginia 22314.]

Approved September 10, 1998

ABSTRACT

This standard defines the minimum detailed information to be included in the powder metallurgy gear specifications submitted by the gear purchaser to the gear producer. This information covers gear tooth geometry data, gear drawing specifications and gear material specifications.

Published by

**American Gear Manufacturers Association
1500 King Street, Suite 201, Alexandria, Virginia 22314**

Copyright © 1998 by American Gear Manufacturers Association
Reprinted June 1999

All rights reserved.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without prior written permission of the publisher.

Printed in the United States of America

ISBN: 1-55589-713-4

Contents

	Page
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Gear tooth geometry data	2
5 Gear drawing specifications	12
6 Gear material specifications	14

Tables

1 Basic data	3
2 Inspection data (for use with composite action testing)	4
3 Inspection data (for use with element measurements)	8
4 Calculation and process test data	11
5 Reference data	12

Figures

1a Generated tooth outline	3
1b Circular-arc fillet forms	3
1c P/M fillet form	4
2a P/M bevel gear	5
2b P/M alternative designs	6
3 Example of format for spur gears (with composite tolerances)	7
4 Example of format for spur gears (with element tolerances)	9
5 Example of format for helical gears (with composite tolerances)	10
6 Example of format for straight bevel gears (with composite tolerances)	11
7 Types of burr related specifications	13
8 Burr traps: chamfer or boss	14

Bibliography	19
---------------------------	-----------

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 6008–A98, *Specifications for Powder Metallurgy Gears.*]

The AGMA Powder Metallurgy Gearing Committee was organized in 1993 with the support of the Metal Powder Industries Federation (MPIF). The work of the Committee is directed toward merging the technology of powder metallurgy (P/M) gearing with the technologies of the more traditional types of gearing.

The Committee, responding to the widely recognized need for improving the technical communication between powder metallurgy gear purchasers and producers, selected as its first project this specification standard. The primary objective of this standard is to increase understanding by the gear purchaser of the responsibility to thoroughly define the gear requirements to the gear producer.

This version was approved by the AGMA membership in November 1997. It was approved as an American National Standard on September 10, 1998.

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.

PERSONNEL of the AGMA Powder Metallurgy Committee

Chairman: Irving Laskin Consultant
Vice Chairman: Glen A. Moore Burgess-Norton Manufacturing Company

ACTIVE MEMBERS

T. Allen Cloyes Gear & Products, Inc.
W.D. Badger General Motors Corporation
D.A. Bobby Windfall Products, Inc.
F. Eberle Rockwell Automation/Dodge
M. Egan Capstan Atlantic
J. Falleur Cloyes Gear & Products, Inc.
K. Gitchel Universal Technical Systems, Inc. (Deceased)
J.A. Hamill Hoeganaes Corporation
E. Holzle Allied Sintering, Inc.
A. Krieg Keystone Powdered Metal Company
D.D. Osti Carbon City Products
S. Patel Hoeganaes Corporation
J.R. Pauline Mascotech Sintered Components
T. Pfeufer St. Mary's Carbon Company
T. Prucher Burgess-Norton Manufacturing Company
J.T. Rill Black & Decker, Inc.
G.A. Rising Mercury Marine
D.W. Risner GKN Powder Metallurgy, Inc.
R. Rupprecht St. Mary's Carbon Company
A. Sabbani General Motors Technical Center
H. Sanderow Management & Engineering Technologies
K.C. States Windfall Products, Inc.
G. Wallis Dorst America

ASSOCIATE MEMBERS

R.E. Bergmann Gear Research Institute
W.H. Clark Ryobi Motor Products
D.S. Ellis ABA-PGT, Inc.
D. Fritzingler Power Wheels
R.J. Galipeau Plastics Technology
D.L. Gibboney Federal Mogul Sintered Products
J.R. Hamilton Cloyes Gear & Products, Inc.
R.F. Larkin Capstan Atlantic Sintered Metals
J.F. Minden Cloyes Gear & Products, Inc.
D.G. Ritter National Broach & Machine
F. Ruppert Rockwell International Corporation
Y. Trudel Quebec Metal Powders, Ltd.
D. White Metal Powder Industries Federation

(This page is intentionally left blank.)

American National Standard – Specifications for Powder Metallurgy Gears

1 Scope

This standard describes the specification data required to adequately inform the producer of powder metallurgy (P/M) gears about the gear design features desired by the purchaser. It also describes some of the related industry practices which commonly apply unless replaced by written agreement between producer and purchaser.

1.1 Types of gears

The general specifications in this standard cover selected types of gears made by the P/M process. Specifications on gear tooth geometry are described in detail for external spur and helical gears and for straight bevel gears. Similar specifications can also be applied to other types of gears, such as internal gears, with the substitution and addition of the required gear feature data.

1.2 Types of P/M processes

This standard applies to gears made by the conventional P/M process consisting of compaction followed by sintering and, in some cases, by post sintering treatments. Gears made by metal injection molding (MIM) or other P/M processes may require other specifications or practices.

2 Normative 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.

The gear terms used are defined in the following standards:

AGMA 390.03a, *Gear Handbook - Gear Classification, Materials and Measuring Methods for Bevel, Hypoid, Fine Pitch Wormgearing and Racks Only as Unassembled Gears*

AGMA 910-C90, *Formats for Fine-Pitch Gear Specification Data*

ANSI/AGMA 1003-G93, *Tooth Proportions for Fine-Pitch, Spur and Helical Gearing*

ANSI/AGMA 2000-A88, *Gear Classification and Inspection Handbook - Tolerances and Measuring Methods for Unassembled Spur and Helical Gears (Including Metric Equivalents)*

ANSI/AGMA 2002-B88, *Tooth Thickness Specification and Measurement*

ANSI/ASME Y14.5M (1994), *Dimensioning and Tolerancing*

MPIF Standard 35 (1997), *Materials Standards for P/M Structural Parts*

3 Terms and definitions

General P/M terminology can be found in the glossary of the *Powder Metallurgy Design Manual* published by Metal Powder Industries Federation (MPIF). Mechanical properties of powder metallurgy materials can be found in MPIF Standard 35.

The following is a list of P/M terms used in this standard, along with their definitions.

coining: A repressing operation to increase density or to add details to the gear face(s) or both.

compact: An object produced by the compression of metal powder, generally while confined in a die, with or without the inclusion of nonmetallic constituents.

compaction: The process for producing a compact.

density: The mass per unit volume of a P/M part. Density (dry) applies to an unimpregnated part.