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Guide to General-Purpose Synchronous Motors without Excited Rotor Windings

National Electrical Manufacturers Association

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Guide to General-Purpose Synchronous Motors without Excited Rotor Windings

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Foreword

This guide has been developed by the Motor and Generator Section and approved for publication as a standard of the National Electrical Manufacturers Association. It is intended to assist users in the proper selection and application of motors and generators. All persons having experience in the selection, use, or manufacture of electric motors and generators are encouraged to submit recommendations that will improve the usefulness of this guide. Inquiries, comments, and proposed or recommended revisions should be submitted to the Motor and Generator Section by contacting:

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The best judgment of the Motor and Generator Section on the performance and construction of motors and generators is represented in this guide. It is based upon sound engineering principles, research, and records of test and field experience. Also involved is an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, inspection authorities, and others having specialized experience. For machines intended for general applications, information as to user needs was determined by the individual companies through normal commercial contact with users.

Practical information concerning performance, safety, test, construction, and manufacture of motors within the product scopes defined in the applicable section or sections of this publication is provided in this guide.

In the preparation of this guide, consideration has been given to the work of other organizations whose standards are in any way related to motors and generators. Credit is hereby given to all those standards organizations that may have been helpful in the preparation of this volume.

The standards or guidelines presented in a NEMA standards publication are considered technically sound at the time they are approved for publication. They are not a substitute for a product seller's or user's own judgment with respect to the particular product referenced in the standard or guideline, and NEMA does not undertake to guaranty the performance of any individual manufacturer's products by virtue of this standard or guide. Thus, NEMA expressly disclaims any responsibility for damages arising from the use, application, or reliance by others on the information contained in these standards or guidelines.

This standards publication was developed by the Motor and Generator Section. Section approval of the standard does not necessarily imply that all section members voted for its approval or participated in its development. At the time it was approved, the Motor and Generator Section was composed of the following members:

ABB Group—Fort Smith, AR
Bluffton Motor Works—Bluffton, IN
Brook Crompton North America—Toronto, ON
Cummins, Inc.—Minneapolis, MN
GE Industrial Solutions—Plainville, CT
Nidec Motor Corporation—Saint Louis, MO
NovaTorque, Inc.—Fremont, CA
Ram Industries—Leesport, PA

Regal-Beloit Corporation—Beloit, WI, composed of:
- Electra-Gear—Union Grove, WI
- Leeson Electric—Grafton, WI
- Lincoln Motors—Cleveland, OH
- Marathon Electric Manufacturing Corporation—Wausau, WI

Schneider Electric—Palatine, IL
SEW-Eurodrive, Inc.—Lyman, SC
Siemens Industry, Inc.—Norcross, GA
Sterling Electric, Inc.—Indianapolis, IN
TECO-Westinghouse Motor Co.—Round Rock, TX
Toshiba International Corporation—Houston, TX
WEG Electric Motor Corp.—Duluth, GA

Section I
General Standards Applying to All Machines
Part 1
Referenced Standards and Definitions

1.1 Scope

This guide covers general-purpose synchronous motors without excited rotor windings, including polyphase alternating-current permanent magnet motors rated 500 horsepower and less, designed in standard ratings with standard operating characteristics and mechanical construction for use under usual service conditions without restriction to a particular application or type of application, and incorporating all of the following:

a. Across the line starting
b. Permanent magnets in the rotor
c. Open or enclosed construction
d. Rated continuous duty
e. Class B or higher rated insulation system with a temperature rise at rated load not exceeding that specified in 7.15 for Class B insulation.

1.2 Referenced Standards

The following publications are adopted in whole or in part as indicated, by reference in this standards publication.

American National Standards Institute (ANSI)
25 West 43rd Street
New York, NY 10036

ANSI B92.1-1996	*Involute Splines and Inspection*
ANSI C84.1-2016	*Electric Power Systems and Equipment—Voltage Ratings (60 Hz)*
ANSI S12.12-1992 (R2017)	*Engineering Method for the Determination of Sound Power Levels of Noise Sources Using Sound Intensity*
ANSI S12.35-1990 (R2001)	*Precision Methods for the Determination of Sound Power Levels of Noise Sources in Anechoic and Hemi-Anechoic Rooms*
ANSI S12.51-2012 (R2017)	*Acoustics—Determination of sound power levels and sound energy levels of noise sources using sound pressure—Precision methods for reverberation test rooms*
ANSI S12.53-1-2011 (R2016)	*Acoustics—Determination of sound power levels of noise sources—Engineering methods for small, movable sources in reverberant fields—Part 1: Comparison method for hard-walled test rooms*
ANSI S12.53-2-1999 (R2004)	*Acoustics—Determination of sound power levels of noise sources—Engineering methods for small, movable sources in reverberant fields—Part 2: Methods for special reverberation test rooms*