IEEE Standard for Petroleum and Chemical Industry—Premium-Efficiency, Severe-Duty, Totally Enclosed Fan-Cooled (TEFC) Squirrel Cage Induction Motors—Up to and Including 370 kW (500 hp)

IEEE Industry Applications Society

Sponsored by the
Petroleum & Chemical Industry Committee

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Approved 19 March 2009
IEEE-SA Standards Board

Abstract: This standard applies to premium efficiency, totally enclosed fan-cooled (TEFC), horizontal and vertical, single-speed, squirrel cage polyphase induction motors, up to and including 370 kW (500 hp), and 4000 V in National Electrical Manufacturers Association (NEMA) frame sizes 143T and larger, for petroleum, chemical, and other severe-duty applications (commonly referred to as premium-efficiency severe-duty motors). Excluded from the scope of this standard are motors with sleeve bearings and additional specific features required for explosion-proof motors.
Keywords: NEMA frame motors; polyphase induction motor, severe duty motors, squirrel cage motors, totally enclosed fan-cooled (TEFC) motors

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Introduction

This introduction is not part of IEEE Std 841-2009, IEEE Standard for Petroleum and Chemical Industry—Premium-Efficiency, Severe-Duty, Totally Enclosed Fan-Cooled (TEFC) Squirrel Cage Induction Motors—Up to and Including 370 kW (500 hp).

This standard has been prepared in an effort to improve the reliability, efficiency and performance of severe-duty totally enclosed fan-cooled (TEFC) squirrel cage induction motors, 370 kW (500 hp) and below; and to promote uniform specification of such motors in petroleum, chemical and other severe-duty applications. This standard represents the thinking of the petroleum and chemical industry and their supplying motor manufacturers. It was prepared by the Motors Working Group of the Petroleum and Chemical Industry Committee (PCIC).

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Participants

At the time this standard was submitted to the IEEE-SA Standards Board for approval, the Totally Enclosed Fan-Cooled (TEFC) Squirrel Cage Induction Motors Working Group had the following membership:

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Daleep C. Mohla, *Secretary*

William McBride, *PCIC Standards Liaison*

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The following members of the individual balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

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IEEE Standard for Petroleum and Chemical Industry—Premium-Efficiency, Severe-Duty, Totally Enclosed Fan-Cooled (TEFC) Squirrel Cage Induction Motors—Up to and Including 370 kW (500 hp)

1. Overview

1.1 Scope

This standard applies to premium-efficiency totally enclosed fan-cooled (TEFC), horizontal and vertical, single-speed, squirrel cage polyphase induction motors, up to and including 370 kW (500 hp), and 4000 V nominal, in National Electrical Manufacturers Association (NEMA) frame sizes 143T and larger, for petroleum, chemical, and other severe-duty applications (commonly referred to as premium-efficiency severe-duty motors). Excluded from the scope of this standard are motors with sleeve bearings and additional specific features required for explosion-proof motors.

1.2 Purpose

The purpose of this standard is to define a specification that deals with mechanical and electrical performance, electrical insulation systems, corrosion protection, and electrical and mechanical testing for severe-duty TEFC squirrel cage polyphase induction motors, up to and including 370 kW (500 hp), for petroleum and chemical industry application. Many of the specified materials and components in this standard stem from experience with severely corrosive atmospheres and the necessity for safe, quiet, reliable, premium efficiency motors.

2. Normative references

This standard shall be used in conjunction with the following standards. When the following standards are superseded by an approved revision, the new revision shall apply.

ABMA 9-1990, Load Ratings and Fatigue Life for Ball Bearings.[1]

ABMA 11-1999, Load Ratings and Fatigue Life for Roller Bearings.

ABMA 20-1996, Radial Bearings of Ball, Cylindrical Roller and Spherical Roller Types—Metric Design.

API 610-2004, Centrifugal Pumps for General Refinery Services.[2]

ASME B1.1-2001, Unified Inch Screw Threads (UN and UNR Thread Form).[3]

ASTM B117-97, Standard Practice for Operating Salt Spray (Fog) Apparatus.[4]

IEEE Std 112-2004™, IEEE Standard Test Procedure for Polyphase Induction Motors and Generators.[5, 6]

IEEE Std 117-1974™ (Reaff 1991), IEEE Standard Test Procedure for Evaluation of Systems of Insulating Materials for Random-Wound AC Electric Machinery.

IEEE Std 275-1992™ (Reaff 1998), IEEE Recommended Practice for Thermal Evaluation of Insulation Systems for Alternating-Current Electric Machinery Employing Form-Wound Preinsulated Stator Coils for Machines Rated 6900 V and Below

IEEE Std 522-2004™, IEEE Guide for Testing Turn Insulation of Form-Wound Stator Coils for Alternating-Current Electric Machines.

NEMA MG 1-2006 Motors and Generators.[7]

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[1]ABMA publications are available from Global Engineering Documents, 15 Inverness Way East, Englewood, Colorado 80112, USA (http://global.ihs.com/).
[2]API historical materials can be obtained (for a fee) from the American Petroleum Institute Library, 1200 L Street NW, Washington, DC 20005, USA (http://www.api.org/).
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