



AC ELECTRIC MOTORS TOTALLY ENCLOSED TYPE

1.0 GENERAL:

PURPOSE AND SCOPE: To provide functional, performance, and dimensional requirements for Totally Enclosed (TE) motors for industrial applications at Ford Motor Company (hereinafter the Company) operations located worldwide.

Deviations from this Standard are permitted only upon written waiver by the requisitioning activity.

Note: This Standard contains three sets of requirements: Those for North America, both NEMA (NA-NEMA) and IEC (NA-IEC), and those for Europe and/or those countries that follow Euro-Norm Directives and require CE Marked products. Those requirements marked as (NA-ALL) refer to both NEMA and IEC motors for use in North America.

For use in North America, motors shall be Underwriters Recognized () and CSA Certified () to ensure that their construction is in compliance with the appropriate UL/CSA Standards. For use in Countries who follow the Euro-Norm Directives, motors shall be CE Marked () to ensure that their construction is in compliance with the appropriate EN/IEC Directives. It is preferred that all motors be triple certified and marked with all three above symbols.

MANDATORY AND PREFERRED ITEMS: Mandatory requirements of this Standard are characterized by the use of the word "shall". Preferred items are characterized by the use of the word "should".

1.1 TYPES OF MOTORS (NA-NEMA): w-EM1 applies to ALL non-explosion proof three-phase, squirrel cage, 575 volts or less, totally enclosed non-ventilated (IP54 Rated) and fan or blower cooled, 80 degree C rise, 1/4 horsepower or more, alternating current, induction type electric motors.

1.1.1 TYPES OF MOTORS (NA-IEC): w-EM1 applies to ALL non-explosion proof, three-phase, 500 volts or less, Rated IP54 or better and IC 40, IC41, or IC46 cooled 80 degree C rise, 0.18 kilowatt or more, alternating current, induction type electric motors, as defined by IEC 60034.

1.1.2 TYPES OF MOTORS (CE): w-EM1 applies to ALL three-phase, 500 volts or less, IP5x, 80 degree C rise, 0.18 kilowatt or more, alternating current, induction type electric motors, as defined by IEC 60034.

1.2 INCLUDED FRAMES (NA-NEMA): w-EM1 applies to inch-sized NEMA Standard electric motors and to fractional horsepower motors in frame size 56, OR to those Ratings designated in NEMA Standard MG-1 Section 11.31, medium (integral) alternating current machines, frames 143T through 449T.



1.2.1 INCLUDED FRAMES (NA-IEC): w-EM1 applies to metric-sized IEC electric motors, frame sizes 63 to 400, as designated by IEC 60072.

1.2.2 INCLUDED FRAMES (CE): w-EM1 applies to metric-sized IEC electric motors, frame sizes 56 to 400, as designated by IEC 60072.

2.0 REFERENCE STANDARDS:

Whenever a specific Standard is mentioned in this Standard, it is the latest revision, unless otherwise specified.

2.1 Ford Motor Company Manufacturing Standard EX1 supplemental requirements to SAE HS-1738.

2.2 INDUSTRY STANDARDS:

2.2.1 NEMA MG1, Motors and Generators.

2.2.2 NEMA MW1000, Magnet Wire Standards.

2.2.3 IEEE 841, Standard for Petroleum and Chemical Industry - Severe Duty Totally Enclosed Fan-Cooled (TEFC) Squirrel Cage Induction Motors - Up to and Including 500 HP.

2.2.4 NEC/NFPA 70 Article 430, Motors, Motor Circuits, and Controllers

2.2.5 CSA C22.2-100, Motors and Generators

2.2.6 SAE HS-1738, Electrical Standard for Industrial Machinery - Supplement to NFPA 79.

2.2.7 IEC 60204-1, Safety of Machinery, Electrical Equipment of Machines Part 1: General Requirements.

2.2.8 IEC 60034-1, Rotating Electrical Machines Part 1: Rating and Performance.

2.2.9 IEC 60034-5, Rotating Electrical Machines: Classification of Degrees of Protection Provided by Enclosures of Rotating Electrical Machines (IP Code).

2.2.10 IEC 60034-11, Rotating Electrical Machines Part 11: Built-in Thermal Protection Chapter 1: Rules for Protection of Rotating Electrical Machines.

2.2.11 IEC 60072, Dimensions and Output Series for Rotating Electrical Machines: Frame Numbers 56 to 400 and Flange Numbers 55 to 1080.

2.3 CONFORMANCE:



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2.3.1 SUPPLIER'S RESPONSIBILITY: All materials and components supplied to this Standard shall be equivalent in all respects to material upon which approval was originally granted. Any deviations from this Standard, without written notice and subsequent review and re-approval by the Ford Global Manufacturing Standards - Electrical Technical Committee, will be sufficient cause for removal from the Ford Global Manufacturing Standards - Electrical Qualified Source List (E1-QSL).

2.3.2 APPROVALS: All products submitted for evaluation shall be "off-the-shelf" catalog types manufactured with normal production procedures and quality control. Prototype motors will not be considered.

Suppliers shall submit an itemized DATA SHEET, correspondingly numbered with this Standard, completely addressing their compliance with each provision. The Vice President of Engineering or a higher officer of the Supplier's (Manufacturer's) company shall sign this Data Sheet. Suppliers shall also submit copies of any and all test Agency certificates and associated letters and documentation, which cite the actual standards their motors/products were tested to.

Approvals shall be made based on conformance to this Standard as certified by the above DATA SHEET, the required Agency approvals, as well as laboratory and performance tests and documented Shop Trials. All documentation is subject to the review of Ford Global Manufacturing Standards - Electrical Technical Committee.

2.4 MARKINGS (NA-ALL): All motors shall be Underwriters Recognized, CSA Certified, and shall bear the marks of these agencies.

2.4.1 MARKINGS (CE): All motors shall be CE Marked.

Note: To facilitate the use of motors on global applications, all motors should Underwriters Recognized, CSA Certified, and CE Marked and bear the above three marks/symbols.

3.0 PERFORMANCE:

3.1 ENERGY EFFICIENCY (NA-ALL): All motors shall conform to the Energy Policy Act of 1992 (EPACT) as amended, NRCAN, IEEE 841 Section 8, and NEMA MG1 Table 12-10 as tested in accordance with NEMA MG1 Part 12.59, independent of application. **NEMA Premium Efficiency rated motors that exceed EPACT shall always be specified.**

3.1.1 ENERGY EFFICIENCY (CE): All motors shall conform to IEC 60034-1.

3.2 VIBRATION (NA-NEMA): All motors shall meet requirements stated in IEEE 841 Section 6.9 and NEMA MG1 Part 7.07 thru 7.09.