ENGINEERING NOTE

ENCLOSURE

NEMA Electrical Motor Enclosures

Per NEMA Standard MG1 Motor Enclosures are classified according to environmental protection and methods of cooling. Following are definitions of the common motor enclosures encountered excerpted from NEMA Standard MG1-1987.

1.25 Open

One having ventilating openings which permit passage of external cooling air over and around the windings of the motor.

1.25.1 Dripproof

An open motor (ODP) in which the ventilating openings are so constructed that successful operation is not interfered with when drops of liquid or solid particles strike or enter the enclosure at any angle from 0 to 15 degrees downward from the vertical.

1.25.2 Splash-proof

An open motor in which the ventilating openings are so constructed that successful operation is not interfered with when drops of liquid or solid particles strike or enter the enclosure at any angle not greater than 100 degrees downward from the vertical.

1.25.6 Open Externally-ventilated

One which is ventilated by means of a separate motor-driven blower mounted on the motor enclosure. This machine is sometimes known as a blower-ventilated or forced-ventilated motor.

1.25.7 Open Pipe-ventilated

An open motor except that openings for the admission of the ventilating air are so arranged that inlet ducts or pipes can be connected to them. Open pipe-ventilated motors shall be self-ventilated (air circulated by means integral with the motor) or forced-ventilated (air circulated by means external to and not part of the motor).

1.25.8 Weather-protected

1.25.8.1 Type I

An open motor with its ventilating passages so constructed as to minimize the entrance of rain, snow, and air-borne particles to the electric parts and having its ventilated openings so constructed as to prevent the passage of a cylindrical rod 0.75 inch in diameter.

1.25.8.2 Type II

In addition to the enclosure defined for a weather-protected Type I motor, its ventilating passages at both intake and discharge so arranged that high-velocity air and air-borne particles blown into the motor by storms or high winds can be discharged without entering the internal ventilating passages leading directly to the electric parts of the motor itself. The normal path of the ventilating air which enters the electric parts of the motor shall be so arranged by baffling or separate housings as to provide at least three abrupt changes in direction, none of which shall be less than 90 degrees. In addition, an areas of low velocity not exceeding 600 feet per minute shall be provided in the intake air path to minimize the possibility of moisture or dirt being carried into the electric parts of the motor.

MG 1-1.26 TOTALLY ENCLOSED

Enclosed as to prevent the free exchange of air between the inside and the outside of the case but not sufficiently enclosed to be termed air-tight.

1.26.1 Totally-enclosed Nonventilated (TENV)

A totally-enclosed motor which is not equipped for cooling by means external to the enclosing parts.

1.26.2 Totally-enclosed Fan-cooled (TEFC)

A totally-enclosed motor equipped for exterior cooling by means of a fan or fans integral with the motor but external to the enclosing parts.

1.26.3 Explosion-proof (TEXP)

A totally-enclosed motor whose enclosure is designed and constructed to withstand an explosion of a specified gas or vapor which may occur within it and to prevent the ignition of the specified gas or vapor surrounding the motor by sparks, flashes or explosions of the specified gas or vapor which may occur within the motor casing.

1.26.4 Dust-ignition-proof

A totally-enclosed motor whose enclosure is designed and constructed in a manner which will exclude ignitable amounts of dust or amounts which might affect performance or rating, and which will not permit arcs, sparks, or heat otherwise generated or liberated inside of the enclosure to cause ignition of exterior accumulations or atmospheric suspensions of a specific dust on or in the vicinity of the enclosure.

Successful operation of this type of motor requires avoidance of overheating from such causes as excessive overloads, stalling, or accumulation of excessive quantities of dust on the motor.

1.26.5 Water-proof

A totally-enclosed motor so constructed that it will exclude water applied in the form of a stream from a hose, except that leakage may occur around the shaft provided it is prevented from entering the oil reservoir and provision is made for automatically draining the motor. The means for automatic draining may be a check valve or a tapped hole at the lowest part of the frame which will serve for application of a drain pipe.

1.26.6 Totally-enclosed Pipe-ventilated

A motor with openings so arranged that when inlet and outlet ducts or pipes are connected to them there is no free exchange of internal air and the air outside the case. Totally-enclosed pipe-ventilated motors may be self-ventilated (air circulated by means integral with the motor) or forced-ventilated (air circulated by means external to and not a part of the motor).

SEW-Eurodrive standard AC squirrel-cage motors and brakemotors are supplied in accordance with NEMA MG1-1.26.2 as totally enclosed fan cooled (TEFC).