

GENERAL SPECIFICATION

Motors for Use with Variable Frequency Drives

1. This specification covers electric motors installed in non hazardous classified areas.

2. Winding Insulation

a. Motors for use with a variable frequency drives (VFDs) shall have winding insulation that meets or exceeds NEMA MG1 Part 31. Winding insulation shall be INVERTER GRADE® or equal.

b. Windings shall withstand voltage spikes up to peak listed below .

$$V_{Peak} \leq 600 \text{ Volts} \rightarrow V_{Peak} \leq 3.1 * V_{rated}$$

$$V_{Peak} \leq 600 \text{ Volts} \rightarrow V_{Peak} \leq 2.04 * V_{rated}$$

c. Extra phase paper shall be used between each coil set to prevent arcing and failure.

d. Insulation Class shall be minimum Class F.

e. Insulation treatment shall be at least a double treatment of either polyester or epoxy resin. The treatments can be applied by either dip and bake or vacuum pressure impregnation.

3. Motor Bearing

a. Motor bearings shall be protected from shaft current produced by common mode voltages and other electromagnetic interaction of the motor and VFD.

b. All motors 30 Horsepower and larger shall have shaft grounding device on drive/ pulley end.

c. Motors over 100HP shall have at least one insulated bearing. If only a single bearing is insulated this must be the bearing opposite the shaft grounding device.

d. If a shaft grounding ring is not supplied on a motor with both bearings insulated, the coupling to the pump must be insulated and the motor must be grounded correctly to prevent possible shock hazard.

4. Installation

- a. Motors rated for use with VFDs and voltage less than or equal to 460 shall have a cable length no greater than 400 feet. If cable length exceeds 400 feet, analysis shall be done at installation site to check for “ringing” caused by high switching frequencies of the VFD. Filters are required to eliminate any “ringing” found in the system.
 - i. Motors rated greater than or equal to 575 volts with cable length greater than 25 feet shall have analysis done at installation site to check for “ringing” caused by high switching frequencies of the VFD. Filters are required to eliminate any “ringing” found in the system.
- b. Motor shall be grounded to true ground along with a ground run to the grounding stud of the VFD.