

Subject 1004-5

August 31, 2018

SUMMARY OF TOPICS

The following changes in requirements to the Standard for Fire Pump Motors, UL 1004-5, are being proposed:

1. Requirements for motors rated from 601 V – 7.2 kV and greater than 500 hp

STP BALLOTS AND ALL COMMENTS DUE: OCTOBER 1, 2018

For your convenience in review, proposed additions to existing requirements are shown underlined and proposed deletions are shown ~~lined-out~~.

1. Requirements for motors rated from 601 V – 7.2 kV and greater than 500 hp

RATIONALE

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This proposal covers the following changes to UL 1004-5:

- 1) clarification on test requirements for motors rated from 601 V – 7.2 kV and greater than 500 hp;
- 2) clarification on KVA marking requirements for multi-voltage and broad voltage motors; and
- 3) editorial changes to clarify the requirements for the locked-rotor test and operation tests

Fire pump motors rated from 601 V – 7.2 kV and greater than 500 hp – These motors are typically custom built for a specific application and have expected operating characteristics in accordance with Sec. 20 of NEMA MG-1. The voltage rating increase is intended to harmonize with the voltage ratings in the Standard for Fire Pump Controllers, UL 218.

- a) The Locked-rotor test time – Since the purpose of the locked-rotor test is to help ensure a properly rated controller is paired with the motor, the locked-rotor test time for fire pump motors rated from 601 V – 7.2 kV and greater than 500 hp shall be 3 seconds or until the locked-rotor current begins to decline, whichever occurs first. This ensures the maximum locked-rotor value is captured and minimizes the risk of unnecessarily damaging a custom built motor.
- b) Performance curves – A new Table 10.4 with locked-rotor, pull-up and breakdown torques mirroring the values in Table 20.10.1 of NEMA MG-1 which covers standard torque limits for large motors.
- c) Marking requirement for high current designs – For small motors (firepump motors rated at or below 600 V and/or 500 hp or less), the controller is expected to be an off-the-shelf controller for use with a general purpose (NEMA Design B) motor. However, since fire pump motors rated

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above 600 V and greater than 500 hp are custom built for high voltage/high output applications, the option to mark locked-rotor current on the nameplate is provided where the locked-rotor current exceeds the values in Table 8.1 or 8.2 to facilitate the selection of a properly rated controller.

KVA marking for multi-voltage and broad voltage motors – In some cases, changing the wiring connection may result in multiple KVA codes. This provides guidance on which KVA code will be marked on the motor nameplate.

Editorial changes – The locked-rotor test has been rewritten to provide better clarity on the test method and compliance criteria. In addition, the operation tests requirements have been edited to improve readability.

PROPOSAL

8.1 A fire pump motor shall continue to operate and show no evidence of electrical breakdown as a result of the locked-rotor current evaluation specified in 8.2. The current measured during the test shall not exceed the values in Table 8.1 for 60 Hz motors and Table 8.2 for 50 Hz motors. For voltages other than 230 or 380 volts, the locked-rotor current shall be inversely proportional to the voltages. For example, for a 115-volt motor, the maximum locked-rotor current at a given horsepower rating is twice the maximum value at 230 volts. A fire pump motor rated 600 V or less and 500 hp or less is to be operated for 12 seconds at rated voltage and frequency with the rotor locked. The locked-rotor current is to be measured during the first 3 seconds of the test.

8.2 One sample of the motor is to be operated for 12 seconds at rated voltage and frequency with the rotor locked. The current is to be measured during the first 3 seconds of the test. After the locked-rotor operation, and while still in a heated condition, the motor shall be subjected to the Dielectric Voltage-Withstand Test of UL 1004-1 without evidence of electrical breakdown. The motor shall operate after the application of the dielectric potential. A motor rated from 601 V – 7.2 kV, or greater than 500 hp, is to be energized at rated voltage and frequency with the rotor locked for 3 seconds or until the locked-rotor current begins to decrease, whichever occurs first. The locked-rotor current is to be measured at the conclusion of the test.

8.3 A fire pump motor shall continue to operate and show no evidence of electrical breakdown as a result of the Locked Rotor Test.

8.4 The measured locked-rotor current for a motor rated 600 V or less and 500 hp or less shall not exceed the values in Table 8.1 for 60 Hz motors and Table 8.2 for 50 Hz motors when adjusted to the rated voltage. For voltages other than 230 V or 380 V, the locked-rotor current shall be inversely proportional to the voltages. (For example, for a 115 V motor, the maximum locked-rotor current at a given horsepower rating is twice the maximum value at 230 V.)

8.5 The measured locked-rotor current for a motor rated from 601 V – 7.2 kV, or greater than 500 hp, shall not exceed the values in Table 8.1 for 60 Hz motors and Table 8.2 for 50 Hz motors when adjusted to the rated voltage, unless marked as indicated in 11.7.