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SPECIFICATION EO – 5132

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SUMP PUMPS FOR UNDERGROUND TRANSFORMER VAULTS

FILE: PURCHASE AND TEST - MANUAL NO. 6

TARGET AUDIENCE	**PURCHASING**
NESC REFERENCE	**N/A**

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1.0 PURPOSE

This specification details the requirements for electric sump pumps.

2.0 APPLICATION

Sump pumps are installed to remove water from sidewalk-type transformer vaults.

3.0 REFERENCES

3.1 *"American National Standard Institute," American National Standard for Submersible Pump Tests ANSI/HP 11.6-2001.*

3.2 *"Underwriters Laboratories Inc. (UL)," Standard for Safety for Motor Operated Water Pumps UL 778.*

3.3 *"National Electrical Manufacturers Association," Standards Publication MG 1-2006.*

4.0 REQUIREMENTS

4.1 Design Details

4.1.1 The pump motor shall be a single phase, 115V, 60 Hz, 0.4 to 0.5 horse power (HP).

4.1.2 The housing of the pumps shall be cast iron with a corrosion resistant coating.

4.1.3 The power cord shall be oil resistant and weather proof with a minimum temperature rating of 90° C. The cord shall be fitted with a three prong grounding type plug. The length of the cord shall be 15 ft.

4.1.4 The entry point of the cord set to the pump shall be equipped with a liquid tight seal and wire mesh type strain relief device(s). The strain relief shall be sized so that the grip securely grasps the power cord without placing any mechanical load on or causing any damage to the cord seal. The fitting and mesh portion of the strain relief shall be made of corrosion resistant material.

4.1.5 A strainer device shall be installed at the intake level of the volute of the pump. The device shall prevent entry of debris larger than 3/8 inch diameter into the volute**.**

4.1.6 The pump shall be fitted with extended legs of sufficient length so that the lowest end of the strainer device fitted to the pump will be approximately 3" above the surface on which the pump is placed.

4.1.7 The discharge pipe size shall be 2" diameter NPT (National Pipe Thread), female, directed vertically.

4.1.8 The mechanical seals for the oil filled motor section of the pump shall be dual seal type made of either silicon carbide bearing against silicon carbide, or carbon bearing against ceramic.

4.1.9 The pump motor shall have NEMA (National Electrical Manufacturers Association) Class F or Class H insulation. Alternate insulation classes may be utilized if sufficient means are employed to provide adequate cooling of the motor at full operating load. The motors shall have thermal overload protection.

4.1.10 The pump impeller shall be a cast iron with of either recessed vortex, or 2-vane open impeller type design. The pump shall be capable of handling 2" diameter spherical solids.

4.1.11 The seal elastomers (square rings, O rings, and gaskets) shall be silicon rubber or Buna-N material.

4.1.12 External fasteners shall be stainless steel, type 18-8 or type 304. The shaft of the sump pumps shall be 400 series stainless steel.

4.1.13 Pumps shall be fitted with a lifting ring to facilitate placement in the vault.

4.1.14 The pumps shall be equipped with a high temperature piggy-back mechanical float switch. The length of the cord attached to the mechanical float shall be 15 ft.

4.1.15 The pumps shall have a corrosion resistant metal plate securely affixed to the case. The following information shall be permanently and legibly imprinted on the plate: manufacturer's name, model, serial number, horsepower rating, and the pump motor features.

5.0 TESTING PROTOCOL

5.1 Procedure

5.1.1 The sump pump testing procedure is based on the American National Standard for Submersible Pump Tests, ANSI/HP 11.6-2001.

5.1.2 The test arrangement shall be the wet pit performance test set up as shown by figure 11.6.3 in ANSI/HP 11.6-2001.

5.1.3 The testing procedures that to be used are: the performance test of section 11.6.4, and the submersible integrity test of section 11.6.7.

5.1.4 The testing shall be modified to include two sets of sump pumps being tested using the same sand in water mixture as specified in par. 5.1.5. Each set shall include three pumps.

5.1.5 A test solution of 0.1 pound/gallon or 12 grams/liter of quartz sand (minimum granular size of 0.031 inches) added to fresh water shall be prepared for use in the test procedure based on ANSI/HP 11.6-2001.

5.1.6 Appropriate measures shall be taken to keep the sand in suspension for the duration of the test.

5.1.7 The first set of 3 sump pumps shall be tested with 10 on/off cycles per hour. The duration for the on portion of each cycle shall be 30 seconds and the off portion will be 5 minutes and 30 seconds.

5.1.8 The second set of 3 sump pumps shall run continuously throughout the test.

5.1.9 Each pump under test shall be loaded with a total head for discharge of 10 feet (+/- 0.5 ft.). A suitable throttling or controlling device shall be used to maintain the discharge loading within this range.

5.1.10 The duration of the testing shall be until failure of all sump pumps occurs or 15 days whichever comes first.

5.2 Test Results

5.2.1 Upon completion of the testing, the manufacturer shall provide a test report that contains the following information for each pump under test:

a Flow rate both before and after the 15 day test period measured while the pump was under a total head load of 10 feet.

b The amperage draw while under total head load of 10 feet, measured prior to and at the end of the testing period.

c Results of the submersible integrity test performed to measure the mechanical and electrical integrity of the pump after the 15 day testing. The method for the housing pressure test in ANSI 11.6-2001, shall be used to measure any possible leakage of the motor housing of the pump.

d Results of the electrical integrity test using the test methods specified in the Insulation Resistance Test in UL 778.

e The report shall also include any additional observations or findings that would affect the performance of the pump under field conditions.

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