



SIEMENS

Ingenuity for life

TechTopics No. 56

Switchgear outdoor enclosure type - Why isn't it NEMA 3?

One of the enduring questions from customers is, "Why isn't outdoor switchgear classified as NEMA 3?" The simple answer is that switchgear conforming to ANSI/IEEE standards (C37.20.2 or C37.20.3) passes requirements substantially more rigorous than those required for a mere "NEMA 3" (or "NEMA 3R") designation.

The NEMA enclosure designation scheme (NEMA 1, NEMA 3, NEMA 12, etc.) is defined in NEMA Standard 250, entitled "Enclosures for Electrical Equipment (1000 Volts Maximum)." It does not apply to medium-voltage equipment, as shown in its title. Further, NEMA 250 is not a universal standard in the sense that it does not automatically apply to any particular apparatus. It only applies if the standard for the particular category of equipment calls for NEMA 250 in the standard. For metal-clad switchgear, ANSI/IEEE C37.20.2 is the relevant standard, while for metal-enclosed interrupter switchgear, the relevant standard is ANSI/IEEE C37.20.3.

Neither standard accepts NEMA 250 for enclosure requirements.

NEMA 3R enclosures must provide a degree of protection against rain, sleet and damage from external ice. Rain and sleet are an issue with outdoor switchgear but ice is not, as there are no external handles for operating mechanisms (for circuit breaker or switch operation).

Tests required for NEMA 3R enclosures include a rod entry test, a rain test, an icing test and a corrosion test.

Rod entry test: This test is equivalent to that specified in ANSI/IEEE C37.20.2 or C37.20.3.

- Rain test: The NEMA 250 test is conducted with water sprayed from nozzles with a pressure of 5 psi, approximately equivalent to rain driven by a 5-mph wind. The spray must be directed at the top and exposed sides. This is inferior to the driven rain test specified in ANSI/IEEE C37.20.2 or C37.20.3. In the C37 test, the water pressure is 60 psi, and the nozzles are oriented so that the upper edge of the water spray is horizontal.

The intent is to simulate rain driven by a 65-mph wind. Further, in the C37 test, additional nozzles are added, aimed at the mounting surface (e.g., concrete pad) around the equipment so that the test checks to see if water that splashes up from the ground enters the enclosure. The NEMA 250 rain test is greatly inferior to the ANSI/IEEE C37.20.2 or C37.20.3 driven rain test.

- Icing test: The NEMA test is intended for enclosures that have operating mechanisms (for switches, circuit breakers or similar devices) protruding through the enclosure and exposed to the weather. Since switchgear does not have such operating mechanisms on the exterior of the enclosure, the icing test is irrelevant.

- Corrosion test: NEMA requires a 200-hour salt spray test of the paint system. In contrast, IEEE standards for switchgear require a salt spray test of at least 600 hours, considerably in excess of the NEMA 250 requirement.

In summary, outdoor enclosures conforming to ANSI/IEEE C37.20.2 or C37.20.3 exceed the requirements of an enclosure rated 3R to NEMA 250. Since ANSI/IEEE C37.20.2 and C37.20.3 do not recognize NEMA 250, Siemens does not show a "NEMA 3R" designation on our switchgear.

Published by Siemens Industry, Inc. 2017.

Siemens Industry
7000 Siemens Road
Wendell, North Carolina 27591

For more information, please contact our Customer Support Center.
Phone: +1 (800) 333-7421

www.usa.siemens.com/techtopics

Article No. EMMS-T40093-00-4AUS

Printed in U.S.A.

© 2017 Siemens Industry, Inc.

The technical data presented in this document is based on an actual case or on as-designed parameters, and therefore should not be relied upon for any specific application and does not constitute a performance guarantee for any projects. Actual results are dependent on variable conditions. Accordingly, Siemens does not make representations, warranties, or assurances as to the accuracy, currency or completeness of the content contained herein. If requested, we will provide specific technical data or specifications with respect to any customer's particular applications. Our company is constantly involved in engineering and development. For that reason, we reserve the right to modify, at any time, the technology and product specifications contained herein.