NEMA MG P3-2020

Joint Position on Online Partial-Discharge (PD) Measurements

Published by:

National Electrical Manufacturers Association
1300 North 17th Street, Suite 900
Rosslyn, Virginia 22209

www.nema.org

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Joint Position on Online Partial-Discharge (PD) Measurements

NEMA and European Committee of Manufacturers of Electrical Machines and Power Electronics (CEMEP) wish to register their concerns with online partial discharge (PD) testing of medium voltage stator windings as described in Annex C, Clause C.1 of IEEE 3004.8-2016, *IEEE Recommended Practice for Motor Protection in Industrial and Commercial Power Systems*. Clause 8.5.4.6 of this Standard makes reference to this test.

Clause C.1 proposes only one method for measuring PD online, and more concerning, Table C.1 essentially provides PD limits in nanoCoulombs (nC), which can easily be interpreted as applying to new motors. The PD levels in Table C.1 directly contradict the contents of Clauses 8 and 11 of IEEE 1434, *IEEE Guide for the Measurement of Partial Discharges in AC Electrical Machinery*. That is, IEEE 1434 states that there is no scientific way to establish PD limits for complete windings with a low-frequency test method.

Additionally, IEC 60034-27-2: *On-line partial discharge measurements on the stator winding insulation of rotating electrical machines* allows explicitly different measurement methods using low-, high-, and very high-frequency technologies, provided by many different suppliers globally. Both IEC Standards 60034-27-1 (off-line) and 27-2 (on-line) purposely do not specify any limit values of PD-measurement results, as these would depend on manufacturer-specific materials and technologies used.

Therefore, some OEMs suggest that the levels can result in new motors with perfectly good stator windings being rejected. As a result, NEMA and CEMEP Member companies present at an IEEE 1434 working group meeting held June 18, 2019, were unanimous in their view that Table C.1 should be deleted from Clause C.1 of Annex C. Also, since this clause suggests only one test method and that method is used by only one vendor, either alternative methods should be listed (see IEEE 1434-2014 Table 1, which lists 14 others) or reference to IEEE 1434 should be made for how PD can be measured.

We suggest that Table C.1 of IEEE 3004.8-2016 be deleted as soon as possible, either during the revision of IEEE 3004.8, if the Standard is currently undergoing revision work, or by an amendment if a revision is not being contemplated soon.

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The National Electrical Manufacturers Association (NEMA) represents nearly 325 electrical equipment and medical imaging manufacturers that make safe, reliable, and efficient products and systems. Our combined industries account for 370,000 American jobs in more than 6,100 facilities covering every state. These industries produce $124 billion in shipments and $42 billion in exports of electrical equipment and medical imaging technologies per year.

About CEMEP

CEMEP is the European Committee of Manufacturers of Electrical Machines and Power Electronics, representing an industry with a market value of € 6.3 billion and 130,000 employees. The Members of CEMEP are the National Associations in Europe, representing manufacturers of electric motors, variable speed drives and uninterruptible power supplies.

This organization allows industry to co-ordinate actions at the European and International level, with the main topics being: market evolution, standardization, regulation, promotion, and connection with other products & professional groups.

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