National Electrical Manufacturers Association

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Understanding Internal Arc Resistant Ratings and Application

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Contents

Introduction

Arc-resistant ratings are an indication of the level of performance of electrical equipment to withstand the effects of an internal arcing fault under specific conditions—generally, with all doors and covers properly secured.

Arc-resistant ratings should not be confused with arc-flash hazard assessment requirements. Arc-flash hazard assessments evaluate personnel risk of exposure to arcing hazards during examination, adjustment, servicing, or maintenance of equipment while the equipment is energized and set the level of personal protective equipment (PPE) required during such activities.

Arc-resistant ratings and associated testing requirements are defined in both IEEE and IEC electrical equipment industry standards (IEEE and/or IEC requirements are also referenced in other standards such as CSA C22.2 No. 0.22).

Although there are differences in the testing and alphanumeric IEEE/IEC codes for designating the ratings, they serve the same general purpose. NFPA 70E makes reference to IEEE C37.20.7 in relation to selection of arc-flash PPE.

The differences between the meaning of the codes can result in confusion on the part of the user when attempting to decipher the rating designations. As a result, purchasers of equipment might over-specify or under-specify a product based on the desired level of protection or perceive that a product carrying one set of ratings provides substantially different (higher) levels of protection than a product rated using the other method.

Ratings

The comparison of the IEEE Type and IEC Class is outlined in Table 1.

Table 1
Comparison of Arc-Resistant Ratings

IEEE Type	IEC Class
Type 1 or 1A	Class A or AF
Type 2 or 2A	Class AFLR
Type 2B	No Equivalent
No Equivalent	Class BF & BFLR
Type 2C	No Equivalent

For equipment certified to the IEEE standard, the suffix “A” may be omitted from the base rating (e.g., Type 1A is identical to Type 1, Type 1 is inherently Type A).

Testing

The design validation testing (type testing) procedures between IEEE and IEC have differences that render them incompatible.

The following discussion of testing is predicated on testing of standard metal-enclosed three-phase air-insulated switchgear; it is not intended to provide detailed information on how to properly conduct the tests necessary to claim the ratings described; rather, it is intended to inform the user of what performance can be expected.