Specifying low-voltage switchgear with a focus on arc-flash safety

Arc-flash

is the energy release that occurs during an electrical fault when current flows through the air between two live conductors, causing a short circuit. In a data center, commercial or industrial setting, an arc-flash routinely produces a powerful explosion marked by searing heat, toxic fumes, blinding light, deafening noise, and massive pressure waves.

Incident Energy

is the amount of energy generated during an electrical arc event.

It increases as the magnitude of the current flowing in the fault and clearing time increase. Incident Energy (IE) is based on the voltage level and available bolted fault current combined with the clearing time of the equipment installed.

Technology exists to reduce the available incident energy or to keep the arc-flash away from personnel.

Each of the solutions mentioned are designed to protect personnel when near and interacting with the low-voltage switchgear.

Reducing the available incident energy

- **Arc Quenching technology:** Arc Quenching Switchgear detects and contains an arc fault in less than 4 milliseconds. Arc Quenching switchgear transfers the arc by creating a lower impedance arcing fault, not a bolted fault, safely contained inside the Arc Quenching Device, resulting in a 25% reduction in fault current
- **Additional NEC Section 240.87 solutions:** Specifying these components within your low-voltage switchgear will reduce available incident energy. Options include utilizing Arc-flash Reduction Maintenance System (ARMS) in the breakers, implementing Zone Selective Interlock (ZSI) configurations in the switchgear or using a differential (87) relay

When incident energy reduction isn't feasible

- **Specify arc-resistant equipment:** Arc-resistant switchgear is designed to safely contain and redirect arc-flash energy away from the operator. Eaton's arc-resistant low-voltage switchgear with two-part door design provides access to circuit breaker secondary terminals while allowing the breaker door to remain closed and retain the IEEE C37.20.7 arc-resistant switchgear accessibility Type 2B rating, with instrument and breaker secondary door open
- **Remote operation to remove personnel from the arc flash boundary:** The remote racking device (MRR1000) permits the operator to open and close a breaker from up to 25 feet away during the rack-in or withdraw process, well beyond the arc-flash boundary for low-voltage switchgear

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