Frequently asked questions

1. When should I consider using arc-resistant switchgear?

Arc-resistant switchgear should be considered whenever operator safety is a concern. Arc-resistant switchgear channels arc energy inside the equipment, away from personnel, and out the top of the switchgear.

2. What standards apply to arc-resistant switchgear?

Arc-resistant switchgear meets or exceeds the standard of ANSI C37.20.7, in addition to all other ANSI/IEEE® standards for low-voltage metal-enclosed switchgear, including UL® 1558 and CSA®.

3. What tests are required for gear to be considered "arc-resistant"?

Testing must be performed according to ANSI C37.20.7. To clarify, Eaton's low-voltage arc-resistant switchgear has been designed and tested to the most conservative interpretation of ANSI C37.20.7—including arcs initiated in all three major compartments (breaker cell, bus, and cable compartments).

4. What are the arc ratings and what do they mean? What arc ratings does Eaton offer for arc-resistant switchgear?

- Type 1—Must be arc-resistant in the front of the equipment only
- Type 2—Must be arc-resistant around the entire perimeter of the equipment
- **Type 2B**—Must be arc-resistant around the entire perimeter of the equipment, even with instrument or control compartment doors open
- Type 2C—Must be arc-resistant between adjacent compartments within the assembly, as well as around the entire perimeter of the equipment

Eaton offers Type 2B arc rating as a standard.

5. What are the seismic ratings for arc-resistant switchgear?

Seismic certified for 2018-IBC and 2019-CBC.

6. How is arc-resistant switchgear labeled, and what does the label mean or state to the person performing maintenance?

Arc-resistant switchgear will have a separate label stating that the gear is certified "arc-resistant" per ANSI C37.20.7 and indicating the short circuit and 0.5 second arc duration rating. Additionally, there will be a second label mounted on the switchgear indicating operating conditions required in order to maintain the arc-resistant rating.

7. What should I do about older, non–arc-resistant switchgear that is already installed?

While non–arc-resistant switchgear does not meet the criteria of ANSI C37.20.7, there are options to increasing the levels of safety, such as retrofitting an Arcflash Reduction Maintenance System™ into the existing equipment to reduce the incident energy level, remote racking devices, zone selective interlocking, and remote operation of breakers. Contact your local Eaton service sales engineer for solutions.

8. Can I retrofit my existing gear to make it arc-resistant?

Currently, there is no design for retrofitting existing non–arc-resistant switchgear into arc-resistant. Eaton Electrical Services & Systems (EESS) can help assess existing installations and offer solutions for enhanced safety.

9. Can I stand in front of arc-resistant switchgear without wearing my personal protective equipment (PPE)?

Arc-resistant switchgear is designed to prevent operator injury based on redirecting the arc energy away from the operator in the event of an arc fault, as determined by testing included in ANSI C37.20.7. The standard for personal protective equipment (PPE) is outlined in NFPA 70E®, which lists the requirements for PPE based on arc flash PPE categories 1 through 4 when working inside of the arc-flash boundary. For 600 volt class switchgear with a standard power circuit breaker with a 0.5 second clearing time, the arc-flash boundary is 20 feet (6 meters) if the design is arc-resistant and doors are open. If an operator intends to be any closer than that, then they would need category 4 PPE. In cases where arc-resistant switchgear that is tested per IEEE C37.20.7 is installed, if the doors are closed and secured, there is no arc-flash boundary or PPE requirement for operators.

The exception is if the site is utilizing one of Eaton's Arc Quenching solutions, which, while active, limits the available incident energy in the low-voltage switchgear to 1.2 calories per centimeter squared and lower. In that situation, the arc-flash boundary remains at zero even when breakers are removed and compartment doors are open. For Eaton's Arc Quenching solutions, category 2 PPE is only required for active work on the switchgear.

10. Will the arc-resistant switchgear be destroyed in an arc event?

Arc-resistant switchgear is not designed to preserve the operational condition of the equipment, only to protect operating personnel located outside of the equipment.

11. Is any additional maintenance required for proper operation of arc-resistant switchgear?

No additional maintenance is required for arc-resistant switchgear beyond what is normally required for standard Magnum DS™ switchgear. However, during installation the following should be completed:

1. Inspection to make sure all enclosures and door bolts are present and fastened.
2. Inspection to ensure that dynamic flaps operate smoothly and always remain in the open position when no force is applied.
3. Inspection to ensure that roof flap retaining inserts are installed properly according to manufacturer's specifications (where applicable).

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12. Does the use of arc-resistant switchgear change the footprint of low-voltage switchgear, or does it change the supports at the base?

There are no footprint changes to our standard structure sizes using arc-resistant switchgear. There are also no changes to how the switchgear is anchored. However, for layout purposes, arc-resistant switchgear must be 66 inches (1676.4 millimeters) wide minimum due to the volume of space needed to handle the arc pressure inside the gear.

13. How does arc-resistant construction affect the weight of the switchgear?

The weight of arc-resistant switchgear is similar to standard Magnum DS switchgear, with no appreciable change in weight, unless a plenum is added. The arc plenum will add approximately 50 pounds (22.6 kilograms) per structure to the overall weight.

14. What breakers are available in arc-resistant switchgear?

We currently offer the Magnum DS breaker only in our arc-resistant switchgear.

15. What are the required clearances around arc-resistant switchgear?

Arc-resistant switchgear has the same clearances as defined by NEC® for traditional Magnum DS switchgear. No additional front or rear clearances are required. There is also a requirement for a minimum 10 feet (3.05 meters) floor-to-ceiling height for arc-resistant switchgear.

16. Can I exhaust the arc in the same room, or do I need a plenum?

We offer an arc-resistant design without an arc plenum. However, the floor-to-ceiling height must be a 10 feet (3.05 meters) minimum. Additionally, no obstructions can be located between the arc-resistant switchgear and the 10 feet (3.05 meters) ceiling (i.e., cable tray, bus duct, and so on). Lastly, the 10 feet (3.05 meters) minimum floor-to-ceiling height does not account for any housekeeping pads on which the switchgear may be placed.

17. If the plenum option is selected, do the arc plenum and arc duct come preassembled?

No. Some assembly is required at the job site or at the integrated power assembly (IPA) vendor's location.

18. What are the size, mounting location, and clearances required for the arc plenum?

The arc plenum adds approximately 25 inches (635 millimeters) in height to the switchgear, making the overall height 117 inches (2971.8 millimeters) from the bottom of the gear to the top of the plenum. Eaton recommends a minimum of 10 feet (3.05 meters) from the bottom of the switchgear to the ceiling. Reference drawing 25A3416 for exact details on the plenum dimensions.

19. What are the size, quantity, and placement of the arc exhaust ducts when used?

The cross-sectional area of the duct is constant 20 inches high and 24 inches wide (508.0 x 609.6 millimeters). The arc duct will come in standard lengths of 10, 20, 30, and 40 inches (254, 508, 762, and 1016 millimeters). Additionally, left or right 45 or 90 degree bends will be possible with the arc duct. The overall layout of duct, quantity of duct, and placement are job specific and must be determined on a case-by-case basis.

20. Can I exhaust the arc outside of the room via plenum into Class 1, Division 2 area?

Class 1, Division 2 area is defined where ignitable concentrations of flammable gases, vapors, or liquids can exist under multiple types of conditions. Therefore, Eaton does not recommend placement of arc exhausts into these areas.

21. What is the difference between arc-resistant switchgear and standard switchgear regarding number or size of cables in the rear compartment?

There is no difference in the rear cable compartment space available for arc-resistant switchgear versus standard Magnum DS switchgear. However, for top incoming cables, the conduit depth dimension is reduced by 16 inches (406.4 millimeters).

22. Does the use of arc-resistant switchgear preclude the use of a top-of-switchgear rail-mounted lifting mechanism?

Our arc-resistant switchgear allows the use of our standard top-of-switchgear lifting mechanism (Cat. No. 8651C91G01).

23. Are network protectors mounted within switchgear available as arc-resistant construction?

Currently, network protectors are not being offered in our arc-resistant design. This may be considered in future design phases, based on market need and design criteria. Please contact your local Eaton sales engineer if an opportunity exists with network protectors mounted internal to arc-resistant switchgear.

24. Are Eaton high resistance grounding systems (HRG), surge protective devices (SPD), and metering or relaying products available in arc-resistant construction?

Our current arc-resistant switchgear allows for mounting and wiring of all normal miscellaneous components, including HRG, SPD, and all metering and relaying products.

25. Does the use of arc-resistant switchgear change the procedures for racking a breaker into and out of a typical cell compared to the standard switchgear procedures?

There are no differences in breaker racking between the new arc-resistant switchgear and standard Magnum DS switchgear.

26. Can I buy arc-resistant switchgear in an outdoor configuration?

Currently, arc-resistant switchgear is offered in an IPA for outdoor application. Consult your Asheville IPA division sales engineer for more information.

27. What is the premium for arc-resistant switchgear over traditional switchgear?

The premium will depend on the level of protection desired—Type 2B, with plenum or without plenum. Additionally, layout of the switchgear could increase or decrease the premium based on number of breakers per structure. Please contact your Eaton field sales engineer or Asheville division sales engineer for pricing of arc-resistant switchgear.

28. Does Eaton publish installation guidelines for the installing contractor for arc-resistant switchgear?

An addendum to the existing Magnum DS installation manual is available for arc-resistant switchgear: IB01901001E.

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