UL2196: The Next Generation Fire Resistive Cables and Phenolic Conduit

Why the Electrical Industry is using Radix Duralife II Dual Rated CI/CIC Cable and Champion Fiberglass Type XW Phenolic Conduit for Two-Hour Fire Rated Fire Alarm Installations

Executive Summary

In June 2012, UL learned of compatibility issues when Classified Fire-Resistive Cables were used in electrical circuit protective systems where zinc was used as in interior coating in steel conduits, raceways and other system components. Specifically, at high temperatures the zinc coating interacted with the copper conductor creating a brass alloy that melted at a lower temperature than the copper conductors alone, thereby affecting the integrity of the electrical system. The presence of zinc compromised the electrical circuit protective systems and caused them to not conform to UL2196.

As a result, cable manufacturers were no longer authorized to place the UL trademark on the following products:

- UL Classified Fire Resistive Cable (FHJR)
- ULC Listed Fire Resistive Cable (FHJRC)
- UL Listed cable with "CI" suffix (Circuit Integrity)

UL2196 Cable Performance Testing Overview

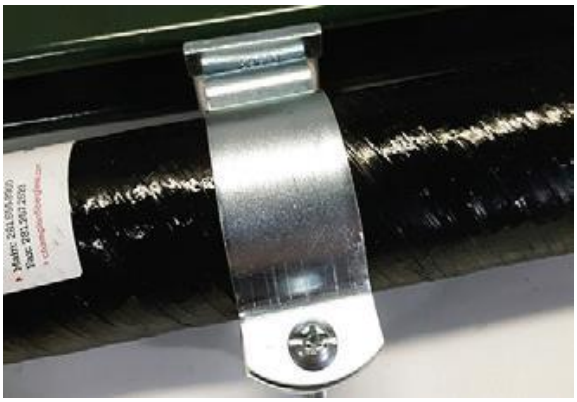
The UL2196 test is designed to evaluate the performance of electrical cables in severe fire events. Critical circuits need to be operational in the case of a fire event. UL2196 addresses this issue with testing designed to evaluate the functionality of electrical circuits during a 2 hour period of fire exposure and afterwards following exposure to a hose stream.

Project Systems Impacted

- 300V Fire Alarm Systems
- Transit & Tunnels
- Area of Refuge Systems
- Two Way Communications
- Smoke Management Systems
- Mass Notification Systems
- Electrical Equipment Rooms

The Fiberglass Advantage

Being the demand for fiberglass conduit in the United States alone has been growing significantly over the last two decades—and is forecasted to increase further as project owners and engineers seek to serve long-term interests of their stakeholders, it made sense to consider investigating the use of fiberglass high temperature phenolic conduit as a solution to the zinc compatibility issue that plagued rigid metal conduit. Recently, Radix and Champion Fiberglass have partnered together to examine, develop and create a cost-effective solution for 300V fire alarm cables that would continue to function while being exposed to the severe fire requirements of UL2196.



The Fiberglass Advantage Detail

Champions Phenolic Fiberglass Type XW high temperature conduit doesn't have the problematic zinc compatibility issues of rigid steel conduit but it contains the zero smoke and zero halogen, high temperature physical properties that enable it and **Radix Duralife II Dual Rated CI/CIC Cable** to continue functioning during the UL2196 Cable Performance testing. Tests were conducted by UL in 2019 resulting in UL issuing an FHIT/FHIT7 28C Listing. This listing is a system compatibility UL Listing which illustrates that both products, when installed together as outlined in the UL FHIT Listing, continue functioning during the entire UL2196 test.

Overall Impact on Project Economics

The Radix Duralife Fire Resistive Cable and Champion Fiberglass Type XW Phenolic Flameshield conduit impacts project economics in the following ways:

- Ensuring the facility or infrastructure will perform as designed well long-term
- Allowing engineers to draft more flexible, efficient and cost-effective designs
- Streamlining the project's implementation and ability to meet milestones
- Protecting project stakeholders from future safety risk and liability exposure
- Meets 1 Hour tenability as per NFPA130 and NFPA502

These various points illustrate the economic and operational impact that choosing the right cable and conduit combination for your 2 Hour Fire-Resistive electrical circuit protective systems will have.