

APPLICATION NOTE

# First glass IR Windows to survive 63 kA blast test

## New Fluke CV Series ClirVu® Window

Arc flash incidents are a very real danger in today's electrical systems. An arc flash releases hot gases and concentrated radiant energy up to four times the temperature of the sun's surface, which can melt metal and cause severe radiation burns, damage eyesight, and result in fatalities. The accompanying pressure waves can damage hearing or brain function and send loose equipment, tools, machinery, and debris flying to cause further injuries.

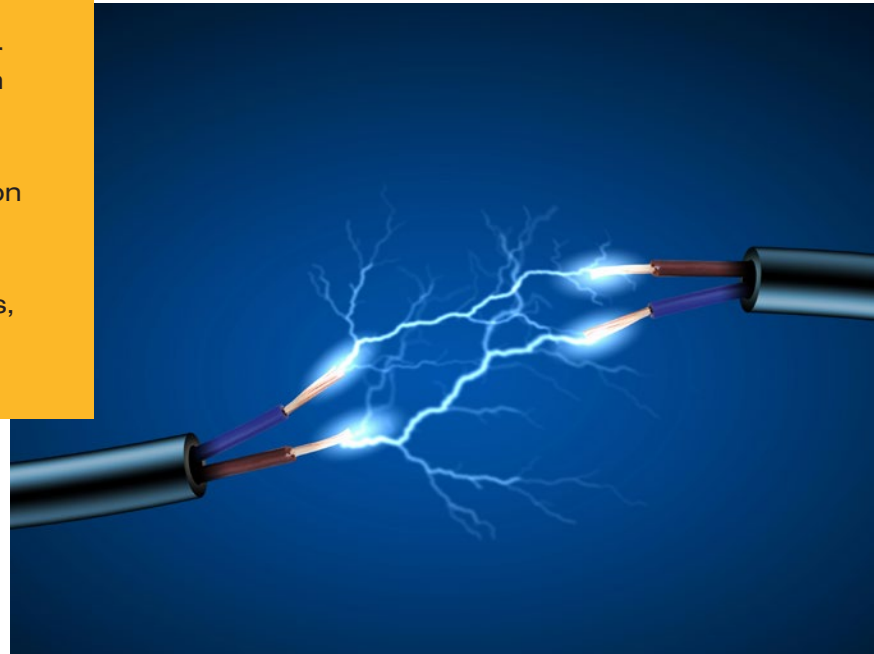
The cause of an arc flash is electric current flowing through an air gap between conductors. It can result from things as simple as touching a test probe to the wrong surface, worn connections, gaps in the insulation, improperly installed parts, or dust and corrosion that cause resistance heating.

Whatever the cause, the reality is that five to ten arc flash accidents involving a fatality or serious injury occur every day in the United States, according to CapSchell Inc. Approximately 2,000 workers will be admitted to hospital burn units in 2014 due to thermal burns from arc flash or arc blast accidents, reports the National Fire Protection Association (NFPA). And even if an arc blast doesn't injure a person, it will damage the equipment and most assuredly cause downtime.

To address those hazards, in 2009 the NFPA revised its 70E Standard for Electrical Safety in the Workplace, with the intent of reducing the risk to workers in arc-flash hazard zones. Installing properly certified infrared (IR) windows to inspect switchgear and motors can make it easier for companies to comply with NFPA 70E. IR windows allow technicians to inspect electrical equipment without removing the panel cover. That saves the step that causes more than 99 percent of arc blast incidents.

### From reactive to proactive protection

In the past many facilities waited until an arc flash incident occurred to install IR windows. But as the frequency of these incidents has increased, many companies are proactively retrofitting existing panels and specifying IR windows for new



equipment. Until recently, most of these installations revolved around low-voltage switchgear, which accounts for the lion's share of industrial applications. And many installations included Fluke arc blast resistant ClirVu Infrared (IR) windows that allowed thermal and visual inspection of low voltage applications.

However, as the number of medium switchgear installations grew, there were no IR Windows available that offered both thermal and visual inspection capabilities designed to safely survive a 63 kV arc blast—the equivalent of three sticks of dynamite.

In 2011 Fluke decided to address those needs, and more, with the next generation of Fluke ClirVu IR Windows. "We did a lot of talking with customers to address how their pain points have changed over time and to identify areas where we could save them time and help them to be more productive and safer in their environment," says Tony Shockey, IR Windows Product Manager at Fluke.

The design team for the new generation of Fluke IR windows was led by Diane Brown, a project manager at Fluke. The principal mechanical engineer for the project was Gary Gunell.

Before coming to Fluke, Gunell worked on a variety of telecommunications and aerospace projects, including designing the audio control panel for the Boeing 787. Part of that project involved strict sealing requirements for the control panel, to avoid a mishap if something was spilled.

While the requirements for IR windows were quite different, high pressure sealing was critical to the successful survival of a 63 kA arc blast. In addition the new windows needed to use the same ClirVu glass as the other Fluke IR windows, and be even easier to install and use.

The new Fluke CV Series ClirVu IR Windows design was chosen from a field of three potential design prototypes. The final design was chosen because it met or exceeded all of the requirements and more. Its high-temperature silicon gaskets, high pressure resistant mounting and door latch hardware, and die cast components were “torture tested” to the highest UL and TUV environmental standards. It is the first glass IR window to have successfully survived a 63 kA arc test to the IEEE C37.20.7 standard at KEMA Labs.

## INSTALLS IN FIVE MINUTES OR LESS

Although the higher blast resistance is the most notable innovation of the new generation of Fluke IR windows it is by no means the only new feature. For starters, one technician can install a CV series IR windows in five minutes or less. It takes just three easy steps, after powering down the equipment. The technician:

**1**

Drills a single hole with a standard Greenlee punch for either 2-inch (50-mm), 3-inch (75-mm), or 4-inch (95-mm) sizes. After the hole is punched the panel door can be closed.



**2**

Positions the window in the hole and tightens the jam screws, which ground the window automatically to the metal enclosure thanks to the patent-pending AutoGround™ process.



**3**

Closes the hinged window cover and secures it with a quarter turn of the latch.



Work permit requirements and NFPA 70E processes are significantly reduced. And often the installer doesn't even have to suit up in full personal protective equipment (PPE).

“Quick installation is a big advantage when you're retrofitting 100 panels,” says Shockey. “The difference between 10 minutes per installation and 5 minutes or less is a pretty substantial time savings when you're shutting down the system.”

### **Helps catch problems early**

Once the CV Series IR Windows are installed, they save inspection time as well. There are no screws to unlatch and no loose door to keep track of. The windows cover is on hinges so all operators have to do is rotate the latch a quarter turn and the door opens. They can use their infrared camera to get a thermal view or use a flashlight to do a visual inspection of the equipment. A security key version is available for use when windows will be located in an unsecured area.

Although the new hinged cover may only save a few minutes of inspection time per window, that can add up.

Above all the cost savings, the CV Series IR Windows make it easier to conduct frequent inspections, which can reduce the risk of serious injury or worse. "More frequent inspections can help you detect problems early so you can go in and fix them before there's a dangerous situation," says Gunell.



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