

## Creating an electrical safety program

Protecting employees from electrical dangers on the job

### Application Note



### Safety Program Case Study

As dangerous jobs go, the world of working with electricity might not seem the most romantic. Unlike fire-fighting or law enforcement, electricians aren't often featured in blockbuster movies as heroic, brave saviors of the street. But working with electricity can be comparatively dangerous and the injury rate for electricians is high. People who work on or near electrical sources have to be extremely careful to avoid electrocution or arc flash incidents.

An arc flash is a devastating outburst of energy that can range in temperature from 2,800 to 19,000 degrees Celsius. It sends a concentrated wave of radiant energy, hot gases and melting metal outwards from its source. The effects on those nearby can include: death, radiation burns, brain damage, hearing and vision loss. It impacts everyone in the immediate zone and flying shrapnel from the blast can even harm those at a distance.

In order to prevent such a tragedy, more and more companies are working to prevent arc flash incidents. In Canada the efforts are still quite new, as the awareness of the dangers of arc flash is not as widespread as it is in the U.S. But one company, Syntech Enerflex in Alberta, is taking the initiative to protect its employees from arc flash now.

Electrical safety programs are a key component in avoiding electrical accidents and protecting employees from arc flash and other electrical dangers.

Syntech Enerflex, one of the largest electrical and instrumentation open shop contractors in western Canada, has developed a brand new safety program targeted at reducing the likelihood of an arc flash incident and in doing so, is leading the way toward increased awareness of the phenomenon in Canada.

The program hinges on the adoption of a new minimum standard for digital multimeters (DMMs). The DMMs, purchased by Syntech Enerflex but owned by the individual workers, are the Fluke 179 CAT IV 600 V/ CAT III 1000 V. Their previous DMMs were not as high quality as the company needed, says Syntech Enerflex health, safety and environment (south) coordinator Larry Johnson, so they sought out new products that came with comprehensive educational tools. Most importantly, says Johnson, they wanted a tool that was proven to be safe and effective in the workplace.



**Product:** Fluke 179 Digital Multimeter

**Profile:** Syntech Enerflex

**Applications:** CSA approval, arc flash training, protocols

“One of the key reasons we went with Fluke was Canadian Standards Association (CSA) approval. Our previous meters were not CSA approved, and even though the tool was built to standards, it was not tested and we felt this was one of the most important aspects to consider when purchasing a meter.” Johnson adds that it was also important that CSA independently verifies that the test tools meet the requirements of International Electro-Technical Commission (IEC) 61010 which itself is the basis for CSA C22.2 No 61010-1-04.

But finding and buying the new meters was only the first step. A meter is only as good as the person operating it, so Johnson and his team set forth investigating everything they could about arc flash. Fluke provided part of the research materials in the form of training seminars and training videos. The other half of the research delved into the standards set in the United States specific to arc flash.

“Once we determined there was an existing meter that was tested and met CSA standards,” says Johnson, “we learned more about arc flash and National Fire Protection Association (NFPA) 70E Standard for Electrical Safety in the Workplace. It’s a standard in the States that talks about how to mitigate the risk around arc flash. We put it to practice around here.”

Together with the meter training tools and the information in NFPA 70E, Syntech Enerflex’s safety program was devised. The centre of the policy is the DMM pre-use inspection procedure. It has 10 steps and focuses on making sure the test tool is in good condition, is right for the job and that the meter and leads are functioning properly (**see sidebar**).

The third component to Syntech Enerflex’s multimeter safety program is called Energized Work Authorization. It outlines the protocol employees have to follow when testing energized equipment. The protocol was based on NFPA 70E as well, which requires the calculation of a flash protection

boundary inside which workers must be protected with personal protective equipment or PPE, such as an arc flash face shield, eye and hearing protection, insulated hand tools, insulated gloves, and fire resistant clothing.

Johnson says the feedback about the program from the employees has been good. “Most of the employees have always checked their meters before they use them, but the new procedure lays it out better for them,” he explains. “It’s their own meter and they look after it as an important tool. They use these ideas to kick it up a notch.”

One of the most important elements of this new training is promoting respect and awareness of the dangers arc flash poses to electrical workers. They form the critical bridge between electrical power and the society and businesses that depend on it. Their safety is not just important to Syntech Enerflex, but for the trade as a whole. Electricians do not need glamour; they need a safe and healthy workplace in which to perform their jobs.



Equipment approved by independent organizations like CSA can help protect users even in the event of operator error.



Pre-use inspection procedures employed at Syntech Enerflex can help avoid equipment damage.

## Syntech Enerflex Safe Work Practice: Multimeter Pre-Use Inspection

1. Check meter for date of last calibration, if the calibration is past due date, do not use meter and send in for calibration.
2. Check rating of meter to ensure meter specs meet job requirements and a minimum of Cat III double insulated.
3. Check meter for CSA or equivalent approval.
4. Check fuses for continuity.
5. Check to ensure OHM and Voltage protection are at the same level (may require checking operators manual).
6. Check condition of case of meter and general condition.
7. Check leads, visual inspection for cracks, bare spots, finger guards, double insulated and category rating.
8. Test leads; turn meter to OHMs and short tests leads together. Meter should show continuity. While still shorted, jiggle leads to check for loose connections or breaks in the leads. Good leads are 0.1 ohms to 0.3 ohms.
9. On Fluke meters to test the fuse, plug test lead into V/Ohm input, select OHMs, insert probe tip into mA input read value, or insert probe into A input and read value. A good fuse should read close to zero.
10. If the meter has had any mishaps or blown fuses, the meter should be inspected before using.

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**Fluke Corporation**  
PO Box 9090, Everett, WA USA 98206

**Fluke Europe B.V.**  
PO Box 1186, 5602 BD  
Eindhoven, The Netherlands

**For more information call:**  
In the U.S.A. (800) 443-5853 or  
Fax (425) 446-5116  
In Europe/M-East/Africa +31 (0) 40 2675 200 or  
Fax +31 (0) 40 2675 222  
In Canada (800)-36-FLUKE or  
Fax (905) 890-6866  
From other countries +1 (425) 446-5500 or  
Fax +1 (425) 446-5116  
Web access: <http://www.fluke.com>

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