

## Arc-Flash Hazards to Be Studied

The IEEE and NFPA have announced formation of a new Arc Flash Hazard Work Group (9/13/04). This work group is to review existing information relating to the thermal effects of an arc and provide accurate and verifiable data. In addition, this work group, unlike the IEEE P1584 work group, will consider other hazards created by a fault, including pressure wave (arc blast) and acoustic effects. The IEEE/NFPA Steering Committee established a Research and Test Planning Committee (RTPC) to develop a research and test plan that will provide data on the nature of electrical arcs.

The objectives of the committee are:

1. Develop a research and test plan to predict the various forms of energy to which a person might be exposed during an arc.
2. Verify existing protocols or generate new protocols to measure the effects of an arc.
3. Develop a scientific relationship between electrical characteristics and hazard characteristics of an arc to develop directly usable data.
4. Define the mechanisms of thermal energy transfer from an arc to the surrounding area and the relationship of each to potential injury.
5. Provide adequate and scientifically verifiable data to the IEEE and NFPA standards and code processes to enable the development of effective safeguards for arc-flash hazards.
6. Develop a testing process to determine the intensity of ultraviolet, infrared, x-ray, and any other potentially injurious energy bands emitted during an arc as well as to determine the potential for injury from each.
7. Determine the impact of equipment installed within an enclosure on existing data related to an arc-in-the-box or develop new information.

As the test parameters and instrumentation (to be defined by the RTPC) are defined, the RTPC will give special consideration to the following factors:

- Location of the arc within the equipment
- Orientation of the arc within the equipment
- Capacity of the electrical system



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- Protective devices and components normally provided in a system
- Electrical equipment normally found in the field

NETA is a contributor for this project, and Jim White (Shermco Industries) is NETA's representative on the work group. NETA is always looking for ways to further safe working conditions for member companies and their employees and has representatives on the NFPA 70E Committee as well as various NFPA, NEC, IEEE, and ANSI committees.

The hazard of pressure waves created by electrical arcs is one that has not been fully investigated. While fewer injuries and fatalities from the pressure wave are believed to occur than from the

hazard of shock or arc flash, once this pressure wave hazard is studied and quantified in the same manner as the thermal effects of an arc, protective measures for the pressure wave can be established. Either new personal protective equipment can be developed or existing personal protective equipment can be shown to be adequate for this hazard.

At a presentation given at the 11<sup>th</sup> Annual IEEE/IAS Electrical Safety Workshop, it was stated that projectiles from exploding electrical equipment can reach speeds of 700 miles per hour. The result of being hit by such an object, plus other hazards such as molten metal and arc plasma vapor, can cause serious injury or death. The study and analysis of this hazard phenomenon are crucial for the continuous improvement of a safer work place.

We will keep you updated as the information develops. Be safe. 

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Ron A. Widup and James R. White are NETA's representatives to NFPA Technical Committee 70E (Electrical Safety Requirements for Employee Workplaces). Ron is past president of NETA and currently a member of the Board of Directors and Standards Review Council. Both are employees of Shermco Industries.