KINECTRICS

ARC Hazard Services

Comprehensive Arc Testing and Hazard Analysis Services by Leading Industry Experts

ARC TESTING OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

With customers around the world, Kinectrics' High Current Laboratory (HCL) is renowned for arc hazard testing, and for the past 20 years, has pioneered the development of leading-edge electric arc testing for arc hazard analysis. In addition to High Current Testing Services for Distribution, Transmission, and other industrial equipment, Kinectrics conducts power arc testing for the evaluation of materials and garments. Power arc testing is carried out in accordance with ASTM and IEC standards, or other client specifications as required. Standard tests include:

- ASTM F1959, Arc Thermal Performance Value (ATPV) on FR fabrics and systems
- ASTM F1891, ATPV on arc resistant rainwear
- ASTM F2178, ATPV on face shields and hoods using instrumented heads
- ASTM F2621, Arc exposure of finished products to verify design integrity
- ASTM F887, Arc exposure on fall-arrest systems using mannequins
- IEC 61482, Arc Thermal Performance Value (ATPV) on FR fabrics system
- Arc suppression blankets

We also offer DC arc testing, electrical incident replication and other custom test programs. The Kinectrics HCL works closely with ASTM, IEEE, EPRI and other standards organizations continuously developing test methods, and advancing the understanding of arc phenomenon.

Kinectrics' modern equipment and expertise provides the best value in the industry, with reliable, accurate reporting that is recognized worldwide.

ARC HAZARD ANALYSIS

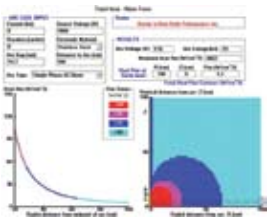
Although half the solution to successful PPE selection lies in testing to acquire knowledge of the capabilities of PPE to withstand dangerous arcs, the other half is knowing exactly what hazards may be available in each unique industrial and utility location. Determining the actual arc hazard is another premier service of Kinectrics. Among other factors, the arc hazard depends on the:

- Arcing fault current
- Arc duration controlled by protective devices
- Length of the arc, and
- Distance of the worker from the arc

Through engineering analysis—using the latest in analytical tools—Kinectrics defines inputs for the above variables and computes for the end user, the amount of radiant and convected thermal energy available at particular sites. Kinectrics can then recommend to clients the protective clothing that is suitable for workers who may be accidentally exposed to electric arc in their facilities. The Kinectrics advantage is a comprehensive understanding of the necessary input variables, and outputs, of the various computation techniques. Kinectrics' staff understand—and can accurately and appropriately apply—the requirements of the many industry standards such as IEEE 1584, NESC, NFPA 70E, CSA Z462 CAN/ULC S801 and OSHA on Arc Hazard Assessment. Kinectrics has successfully completed numerous projects for major North American utilities and has provided advanced technical support for international research and testing projects designed to increase scientific understanding of issues related to arc flash phenomena.

ARCPRO™ SOFTWARE FOR ARC HAZARD ASSESSMENT AND PPE SELECTION

ARCPRO™ has become the industry's most widely-used application for computing arc hazards and selecting protective clothing for single arc situations, particularly for medium voltage and high voltage Transmission and Distribution applications that other methods do not address. Originally developed in 1996, **ARCPRO™** has undergone 3 software version upgrades and over 500 **ARCPRO™** licences have been issued worldwide.



A state-of-the-art program, **ARCPRO™** includes a physics based model of electric arcs. The software models high power arcing by taking into account such complex variables as gas properties, arc electrode materials, thermal radiation and convective energy dissipation. **ARCPRO™** considers the arc current, arc duration, arc gap, worker's distance from the arc, and a number of other factors required in the accurate assessment of arc exposure. **ARCPRO™** computations have been verified by live arc testing in Kinectrics' High Current Laboratory.

ARCPRO™ Calculating the Arc Hazard

Kinectrics' **ARCPRO™** software is an easy-to-use computer program for the calculation of radiated and convected thermal energy from electric arcs. This highly-effective tool offers proven value in helping utilities and other industries select protective clothing and meet workplace regulations for safety apparel. **ARCPRO™** benefits include:

- Ability to easily define arc hazards and select appropriate protective clothing
- Accurate definition of clothing performance to meet arc conditions
- A reduction in safety clothing budget expenditures, while ensuring workers remain protected
- Documentation for modified work practices to remove staff from hazardous areas
- User-accessible FR (Fire Resistant) clothing databases
- Compliance with the mandates of safety authorities

ARCPRO™ Key Features

ARCPRO™ offers several key technical features to accurately analyze and predict the degree of hazard associated with electrical arcs, including calculation of:

- Total heat and heat flux reaching clothing
- Amount of thermal energy radiated by the arc
- Heat release through convective effects
- Spatial heat contours
- Arc parameters, including voltage, current and diameter

ARCPRO™ 3.0 is valid for:

- 1-phase and 3-phase
- DC arcs
- Open-air and enclosed
- Windows 7 and above (including 64 bit systems)

ARCPRO™ Modelling

Kinectrics' **ARCPRO™** calculates the thermal parameters of electrical arcs and is designed to provide users with data on heat exposure, total heat flux and heat energy on a surface at various distances from an electric arc. The software is used to predict the potential arc hazard in a particular work environment.

Kinectrics offers complete and world-renowned capabilities for arc testing of Personal Protective Equipment (PPE), arc hazard analysis and PPE selection.

ARC HAZARD ENGINEERING TRAINING

Learn from the Experts... Kinectrics' practical expertise and leading-edge knowledge in arc hazard testing and assessment is now available through our specialized training courses. Kinectrics' courses are taught by experts, and include case studies and demonstrations in our world class labs and state-of-the-art testing facilities.

Kinectrics' courses are developed using the energy industry's Systematic Approach to Training for Adult Learning. Attend a public session at Kinectrics, or call us if you wish to have a dedicated course on-site at your location or Kinectrics' offices. See **www.kinectrics.com** for courses and schedules.

Kinectrics' full Arc Hazard Engineering Course, led by Stephen Cress, is designed for engineers in utilities and industry, safety officers, program managers, and procurement staff who are responsible for arc hazard assessment in the selection of protective equipment and clothing. This one-day course covers in-depth training in arc flash calculations and PPE.

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