

Fire resistant bra developed in Canada

By Beverly Johnson Women are in particular danger when it comes to electric arc flashes but a new product now offers additional protection



Two workers, one male and one female, are on the job. Which one will be burnt more severely in the event of an electric arc flash?

If you guessed the woman, you'd be correct. The nature of arc flashes dictates that the closer to the source, the more intense the energy. Generally speaking, women's arms are shorter than men's, so women are working closer to the source. In addition, a woman's bust line projects into the danger zone between the two arms, escalating the chance of breast burns when an electric arc flash occurs.

So a woman's breasts are particularly at risk for more severe burns. Regulations are in place for protective shirts or overalls while on the job. Surely a protective flame-resistant outer layer will provide protection to the garments underneath. Or will it?

Synthetic fibres, such as polyester, nylon, acetate and PVC, will melt at relatively low temperatures and can actually melt on the body in industrial accidents. For this reason, safety officers recommend that workers wear only natural fibre undergarments such as cotton, wool, or silk under their flame-resistant clothing. However, an electric arc's explosive nature can "break open" the outer fibre layer and ignite the inner core, causing extensive burns.

The inherent danger of electric arcs is their tendency to "track" on the skin, which puts the impact of the heat energy *underneath* the outer garment. There is a real possibility of flash fire accidents even when the outer clothing layer *has not ignited*. So, while workers are wearing regulation fire resistant shirts, protection from this type of burn has to start with the undergarments.

Hugh Hoagland of ArcWear.com, based in Kentucky, who runs safety apparel seminars around the world, is the world's expert in electric arc burns. "In 1997," he says, "I received two separate calls regarding female utility workers in Washington State. These two women had suffered a similar fate. Both had been performing routine service jobs, placing a meter in a socket, when an arc flash occurred. One lady had a molten metal droplet from the resulting electric arc fall into her cleavage area and ignite her bra. It burned back about two inches before she could get her shirt off to extinguish it. She was wearing a flame-resistant cotton shirt over a polyester/cotton bra. The other lady was performing the same operation when she received a much larger arc flash. She was wearing a lightweight Nomex shirt and her polyester bra melted all over the front of her chest. In both cases, the shirt did not burn but the bra did.

These two incidents convinced Hoagland there was a need for protective undergarments but he needed help to develop, manufacture and market them. ArcStore.com, of Louisville, Kentucky, a company that specializes in unique flame and arc-resistant garments, was the natural choice to take on the marketing of this new bra.

For the actual bra design and manufacture, they looked to Canadian bra designer, Beverly Johnson. Johnson was responsible for the bra's overall design and fit, while Hoagland was responsible for its technical performance. After two years of wash-and-wear testing and fit trials, the ArcBra was tested at the Kinetics Lab in Toronto to an arc rating (ATPV) of 13 cal/cm², which far exceeded the accepted rate of 8 cal/cm².

Johnson says, "When Hugh approached me about this product, it was not long after 9/11, so I thought he was developing this bra for use by fire



fighters. I had no idea how many other occupations exist where female workers are routinely at risk from electric arcing. Then Hugh told me he wanted to use Nomex as a fabric. All I could think of was a nasty suit of armor-like cloth these women were going to have to wear!

"The challenge of this bra was to balance comfort with safety, and looks with practicality. My concern is always with fit and the comfort of the real women inside my bras. The knitting mill was very good about making fabrics to our specs. As a result, the bra is actually very comfortable to wear; more like a comfy fitted sports bra. I feel good that such a product is going to help real women in their chosen professions."

The ArcBra is distributed in Canada through ArcStore.ca and in the United States by ArcStore.com. The company has since developed ladies panties, men's boxer shorts and other FR clothing. ■

Info: Beverly Johnson at 905-318-1799; www.arcstore.ca; or www.arcstore.com

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Ventilated pants offer heat relief and air flow

Thanks to an innovation by Pro-Vents Apparel Ltd., of Toronto, Canadians looking for ways to beat the heat can find relief in a pair of Pro-Vents ventilated pants, that combine “the protection of long pants with the comfort of shorts,” according to Pro-Vents partner Mitchell Zuckerman.

Designed and manufactured in Canada, Pro-Vents pants are suitable for manufacturing and assembly workers, steelworkers, utility workers, city and highway workers, construction workers, and petrochemical workers. They’re also beneficial for consumers engaged in hunting, fishing, camping, gardening, skateboarding and rollerblading where, in addition to helping to deal with the heat, they offer UV protection, abrasion protection and a degree of bug protection.

Pro-Vents pants are made from unique poly/cotton fabrics and look like regular, relaxed fit pants. However, from the knee down they incorporate extremely durable polyester athletic mesh that can be covered, when necessary, with detachable leg covers.

The goal is to ensure protection while allowing for airflow. “When we designed our Pro-Vents pants, we wanted to make sure they would remain exactly that – a pair of pants,” Zuckerman notes, pointing out that similar designs actually become shorts when the leg portions are detached. A line of ventilated coveralls and bib overalls is also under development.

Pro-Vents pants are offered in navy, high visibility orange and high visibility yellow/lime, with non-stock or corporate colors available by special order. In addition to its poly/cotton fabric, which Zuckerman says is the first stretch fabric of its kind to withstand repeated industrial laundering without fading or excessive wear, the company also offers flame resistant and performance materials such as moisture wicking fabrics, and equips certain styles with 3M Scotchlite reflective material. All designs meet Canadian Standards Association (CSA) specifications. ■

For details and a list of distributors, visit www.pro-vents.com.

