The University of Alberta flash fire manikin test chamber has been in service since 1988. In 2002, the University created its Protective Clothing and Equipment Research Facility (PCERF) with the goal of broadening the scope of thermal protective testing and research capabilities. PCERF collaborates with industry, military and government in the testing and evaluation of innovative protective materials, test protocols and equipment.

Westex by Milliken tests extensively at PCERF and annually opens testing to the public to help educate companies and workers on the need for flame resistant (FR) clothing and to further the understanding of flash fire hazards. Attendees witness live flash fire manikin testing of a variety of different FR fabrics to illustrate the extent, severity and location of bodily burns and how FR fabrics perform; there is a huge variance in protection among otherwise compliant products.
FR coveralls, shirts and pants afford workers a few extra seconds of escape time when faced with a flash fire and aim to dramatically reduce or eliminate body burn. The University of Alberta has tested virtually all types of flame resistant garments and fabrics over the years. One of the key learnings from this testing is that performance differs not just between fabric categories (such as meta-aramid vs. FR cotton) but also between brands within each fabric category (such as one “88/12” vs. another “88/12”).

The NFPA 2112 standard calls for flash fire testing to be conducted at three seconds and less than 50 percent total body burn passes. Unfortunately, because NFPA 2112 is a pass/fail standard, many fabric manufacturers will report only “pass” and many end-users only require compliance. Standards are generally written to be inclusive, not exclusive, and as such, provide minimum parameters which most fabrics easily pass. However, as the University’s testing shows, passing grades can and do vary greatly depending on the fabric type and brand. A fabric can pass with 7 percent body burn (7 percent is the minimum body burn due to the head and hands) up to 49 percent body burn — an enormous difference!

Data from different labs can vary marginally, but data should not vary significantly when testing is performed at independent labs in full compliance with ASTM F1930 standards.

Issues of data variability and test duration have caused confusion and disagreement about who is correct and what data is relevant. It has also fostered significant leeway in the marketing of performance comparisons. Some product marketers choose to show end-users a particular point in the performance spectrum because that is the only place they record an advantage, even if that point differs from the official test. The University of Alberta aims to cut through the marketing to prove what performs in a hydrocarbon flash fire event — and what doesn’t.

Since it’s the FR fabric which largely determines the level of protection offered by a protective garment (arc ratings and flash fire performance test results are based on fabric brand and weight), it is critical for safety managers, and other decision-makers, to not only understand the real differences among fabrics, but also how these distinctions impact performance.

People who have attended flash fire testing at PCERF have walked away with a new understanding of hydrocarbon events. This testing has proved invaluable for end-users who have had the opportunity to witness firsthand just how dangerous this hazard is and actually see the performance of different brands that exist in the marketplace. Having the opportunity to observe garments being tested has ultimately helped attendees understand the differences between fabrics and has shaped their FR clothing programs. Shown here are a few testimonials from safety managers that have had the opportunity to attend a testing event at the University of Alberta.

Click here to watch a video of flash fire testing at the University of Alberta — one of the best testing facilities in the world. This video demonstrates side-by-side comparisons of different FR fabrics exposed to flash fires, illustrating the extent, severity and location of burns. See the results and earn how complying with NFPA 2112 and ASTM F1930 can make your workers and company safer.
I have attended the Coverall Burning Demonstration a few times over the past 3 years and each time, I am blown away by the visual representation of what happens in a flash fire. While I enjoy the stunning visuals and the opportunity to see and feel the different types of garments afterwards, the true value in this presentation is the information. The University of Alberta is entirely transparent regarding the testing and its protocols. They answer any questions participants may have. The experience and valuable information delivered during these sessions is the reason I come back each year.

Viewing the demonstration really set in my mind what truly happens to not only the garment, but the person during these types of incidents. The amount of heat generated and the results speak for themselves. The testing really opened my eyes and I learned that not all Fire Resistant materials are made the same. The type of Fire Resistant clothing you decide to equip your workers with can mean the difference between walking away from a flash fire unscathed, or having a lifelong condition.

The University of Alberta has done an incredible job of showing the performance differences between the types of materials used in these garments. The information they dispense before the testing, and afterwards is not only interesting, it is extremely valuable in selecting a Fire Resistant material for your workers. Hearing the factors that affect the performance and then seeing it in action is immensely valuable and educational.

Overall, the value of the testing done at the University of Alberta is immeasurable. I would not completely understand the difference in materials if I wasn’t invited to this testing to see it firsthand, and receive this fabric education. This may seem like a small thing, but without this knowledge, I could have unknowingly selected material that is not suitable to protect my workers. At the end of the day, the message is Fire Resistant can mean many things—not all fabrics are created equal, and the University of Alberta is leading the charge to educate the industry in this respect.

The University of Alberta Protective Clothing Research Facility has been critical to increasing the oil and gas industry’s knowledge base specific to hydrocarbon flash fire and liquid burn hazards. This facility has played a key role in assisting safety professionals with understanding legislation, test standards, certifications and garment limitations in an effort to determine the appropriate PPE for the end user. Having this independent lab right in our backyard has provided the additional advantage of observing the testing first hand.

Testimonials from Safety Managers

Justin Panasuik
Regional HSEQ Manager | Air Liquide Canada

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Martin Mudryk
CRSP CSP RPF EP Team Leader, Safety & Loss Management, Refining & Marketing | Suncor Energy

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(Martin Mudryk Testimonial Continued)

while having direct access to the University’s knowledgeable staff. It is exciting for our safety teams, employees and contractors to witness the various testing processes ‘real time’ while increasing their understanding on how garment construction, laundry, layering and various assessment protocols can influence a product’s overall protective value. Having the opportunity to visualize the garments being tested in this type of environment is an extremely impactful learning experience and one that I highly recommend.

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