Volume 01 | September 2013 | A Westex Publication

FLAME RESISTANT INSIGHTS℠

The source for arc flash and flash fire news

YOUR "NO LIVE WORK" POLICY

Must Include Some Live Work

PLUS:

The Difference Between Arc Rated (AR) and Flame Resistant (FR)

Arc Flash Incident Report

Press Release — Westex TrueComfort™

THE TRUTH ABOUT FLAME RESISTANT FABRIC TERMS

"INHERENT" vs. "TREATED"

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Letter from the President

Thank you for subscribing to Flame Resistant Insights eZine.

Founded in 1919, Westex has nearly 100 years of experience in the textile industry. As the world leader in flame resistant fabrics, we are dedicated to providing the highest quality fabrics, including our Westex UltraSoft®, UltraSoft AC® and Indura® brand fabrics. At Westex, we understand that the majority of the protection, comfort and overall value of any flame resistant/arc rated garment is in the fabric. Therefore, we take great measures to ensure the quality of our fabric on a consistent basis.

While we are proud of the products we produce, manufacturing flame resistant fabric is only part of our business. We recognize that educating the marketplace about arc flash and flash fire hazards, and the importance of wearing PPE, is just as important as manufacturing the fabric. This is why Westex invests so heavily in educational programs such as seminars, webinars, our own information-rich website and independent laboratory testing. In fact, we are proud to be able to share the videos we created of live arc flashes using real-life "low voltage" equipment. We have captured these arc flashes on state-of-the-art video cameras that help better understand the severity of this hazard. We have recently taken this concept to the flash fire world by replicating real-life flash fires with instrumented mannequins to help us understand the duration and energy of flash fires.

Our pursuit to educate workers about the potential hazards they face spans decades with the most experienced technical team members in the industry who are involved in committees such as NFPA and ASTM. As part of our commitment to safety, we are excited to bring you our new Flame Resistant Insights eZine. Every issue will be an excellent resource regarding flame resistant fabrics and clothing, as well as arc flash and flash fire hazards. If you have any technical questions or comments about an issue, please feel free to contact us at insights@westex.com.

Thank you again for subscribing to Flame Resistant Insights. We look forward to hearing from you.

Sincerely,

Daniel Bischoff
President

THE TRUTH ABOUT FLAME RESISTANT FABRIC TERMS:

"INHERENT" vs. "TREATED"

By Scott Margolin
International Technical Director, Westex

We're going to set the record straight by exploring:

- The unscientific origin of the terms, "inherent" and "treated"
- The evolving meaning of these terms over time
- Why "proven" vs. "unproven" is a more useful basis for comparison

In the protective clothing industry, there has been substantial debate about the merits of two types of flame resistant (FR) fabrics — "inherent" and "treated." These two terms are commonly used to describe different approaches to producing the FR properties of a fiber. Unfortunately, much of what has been written about the distinctions between "inherent" and "treated" fabrics has been inaccurate, incomplete or misleading.

Because it's the FR fabric that 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 to not only understand the real differences among fabrics, but also how these distinctions impact performance.

The Role of Marketing in FR Fabric Terminology

First and foremost, it is important to understand that "inherent" and "treated" are marketing terms with no origin in textile science and with little or no consistency of application fiber to fiber, fabric to fabric, or year to year. Sales literature frequently implies that one method is better than the other, and the marketing spin has been that the FR properties of "treated" fabrics wash or wear out, while those of "inherent" fabrics do not. Like virtually everything else in life, neither method is perfect and each has its pros and cons, but repetition over time has created impressions in the marketplace that are simply not borne out by the facts.

The word "inherent" was not originally a textile or FR term. Its definition varies slightly from source to source, but the common thrust is "by its very nature, built-in, implicit." On the other hand,

"treated" is usually defined as chemical engineering to impart properties not previously present. Nature provides very few FR fibers — the most well known being asbestos — which is obviously not in common use in protective apparel in North America today. Conversely, all flame resistant fibers in common use today for industrial protective apparel are engineered by humans — using chemistry — to be flame resistant.

It can also be said of generic 100% cotton FR fabrics that have hit the market in the past five years. However, when it comes to the fabric brands that have the largest share in this category, Westex UltraSoft® and Indura®, the engineering technology results in a fabric that is guaranteed to be flame resistant for the life of the garment.

What is important is not how the engineering was accomplished, but that it was accomplished correctly and consistently, so that a garment maintains its flame resistance weeks, months and years later — regardless of how many times it is laundered.

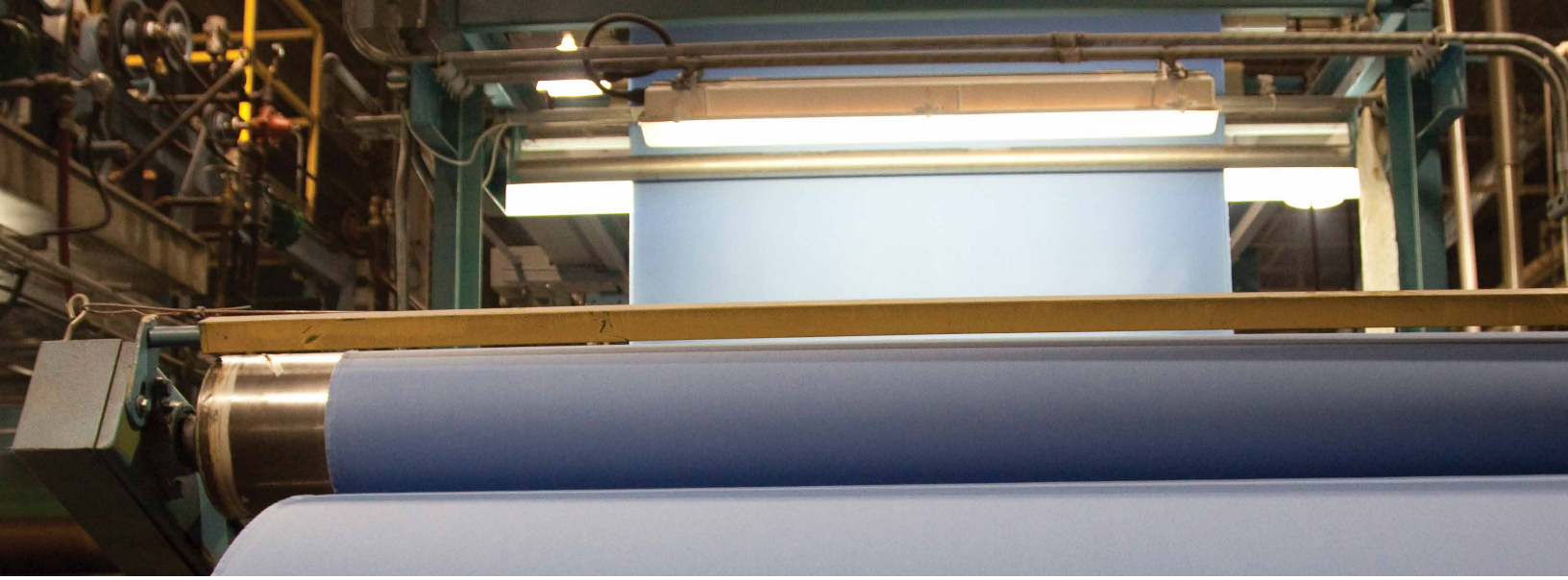
So what does "inherent" mean as applied to the FR fabric market? Regardless of actual definition, the value cited by virtually everyone is that "inherent" FR garments won't wash out, that they are FR for life. However, "inherency" is not the only path to engineering life-of-the-garment flame resistance.

What does "treated" mean as applied to the FR clothing market? To many, it means a fabric whose FR properties are topical and/or temporary. This may be true with some generic, unbranded 88% cotton/12% nylon fabrics (sometimes referred to as "88/12 FR").

How New Fabric Blends Complicate Naming

Most popular FR fabrics today are blends of different fibers, and this has created another whole level of misuse and misunderstanding. One or more major manufacturers are currently marketing each of the following examples as "inherent":

- Should we call a blend of "inherent" and "treated" fibers "inherent"? If so, at what ratio of "inherent" to "treated"?
- What about a fabric that is about 15–20% "inherent" (by the original definition), about 40–50% of a fiber that used to be called "treated," but has recently been relabeled "inherent," and about 30–40% non-FR natural fibers?
- What should we call a fabric in which half the blend is an FR fiber that was called "treated" for 20 years, but recently was relabeled "inherent"?



The Real Distinction: Proven vs. Unproven

At the end of the day, the only real measure of a flame resistant fabric is whether its performance and protection are proven. *Here is what proven should mean:*

It starts with repeated independent laboratory evaluation. However, it is critically important to understand that this is a starting point, NOT an end point. Performance in the real world, over time, is absolutely essential to vetting the full range of FR fabric/garment performance.

There are a number of reasons for this:

- Standards are generally written to be inclusive, not exclusive, and as such, provide de minimus parameters that most fabrics easily pass.
- Test samples are self-submitted and, once certified, never checked again, much less by random, third-party acquisition from commercially available stock. And as a result, what is later manufactured in full commercial scale too often bears little or no resemblance to what was originally submitted for certification.
- The laundering tests in particular are minimal — they involve lower (and often MUCH lower) laundering cycles than service life, and are conducted under perfect conditions: water temperature, chemistry, detergent types and loads, garment loads, wash and dry times and temps, etc. But how representative is this of real-life laundering conditions?

Given these facts, it's easy to see why proven performance, over time, in actual use is a vitally important factor when evaluating and specifying FR fabrics. So what should constitute proven performance? When many different large users across different industries have purchased, worn and washed the garment for 2–4 years until replacement becomes necessary, and then re-purchased the same product, a pattern of reliability begins to be established. Two full replacement cycles (requires selection of the same item for the third cycle) is the threshold, and the larger and more global the customer base who make these decisions, the more reliable the market proof.

Ensuring FR Protection, Comfort and Value

The fabric properties most important to wearers of flame resistant apparel are protection, comfort and overall value. Durability of these properties is critical; what ultimately matters most is that the apparel is flame resistant for the life of the garment and market-proven. The "inherent" vs. "treated" worldview is simply inaccurate and/or actively misleading — both on the fiber level and as applied to fabric blends.

There have been too many failures, including FR durability, excessive shrinkage, poor comfort and more. The critical differentiator should be "proven" vs. "unproven," because lives are on the line.

If your facility doesn't have the f

- Written lockout/tagout policy
- PPE program for shock and arc flash
- Written electrical safe work practices
- Hazard assessment to determine shock and arc flash hazards
- Lockout/tagout training

The best way to protect employees from electrical hazards is always to establish an electrically safe work condition when working around electrical hazards.

The NECplus.org — a fantastic National Fire Protection Agency website — states:

> The most effective way to prevent an electrical injury is to completely remove the source of electrical energy and eliminate the possibility of its reappearance.

Having a "No Live Work" policy, which is what most of us call it in the field, is really great, and I applaud your efforts. But, a "No Live Work" approach comes with its own hazards — which are often missed.

To achieve an electrical safe work condition, the procedures of your organization's lockout/tagout policy must be followed. Those procedures must include verification of isolation. This means a qualified person must choose an appropriate voltmeter to test the circuit to verify an absence of voltage. This is live work.

YOUR "NO LIVE WORK" POLICY

MUST INCLUDE SOME LIVE WORK

By Daryn Lewellyn
Founder/CEO,
Lewellyn Technology

www.lewellyn.com

ollowing, you have work to do:

- Qualified electrical maintenance personnel with 70E training
- Lockout/tagout equipment
- Appropriate voltmeters
- Insulated tools

It's live work because, until you have verified it, you do not yet have an electrical safe work condition. Every circuit is live until we have verified it's not, no matter how sure we are that it's turned off. We can never be indecisive about this. There are thousands of stories out there involving someone being electrocuted because they contacted a circuit they thought was off.

We also have to verify the voltmeter is working properly before and after we check the circuit. Doing the voltage test is live work.

You can't work de-energized without first doing live work. So the idea that some facilities don't need 70E because they have a "No Live Work" policy is not accurate. Everyone still needs 70E and the PPE it requires.

This list to the left is not complete, but it will get you started.

Even facilities with a "No Live Work" policy need these things. Hopefully, this helps you navigate your way through 70E implementation.

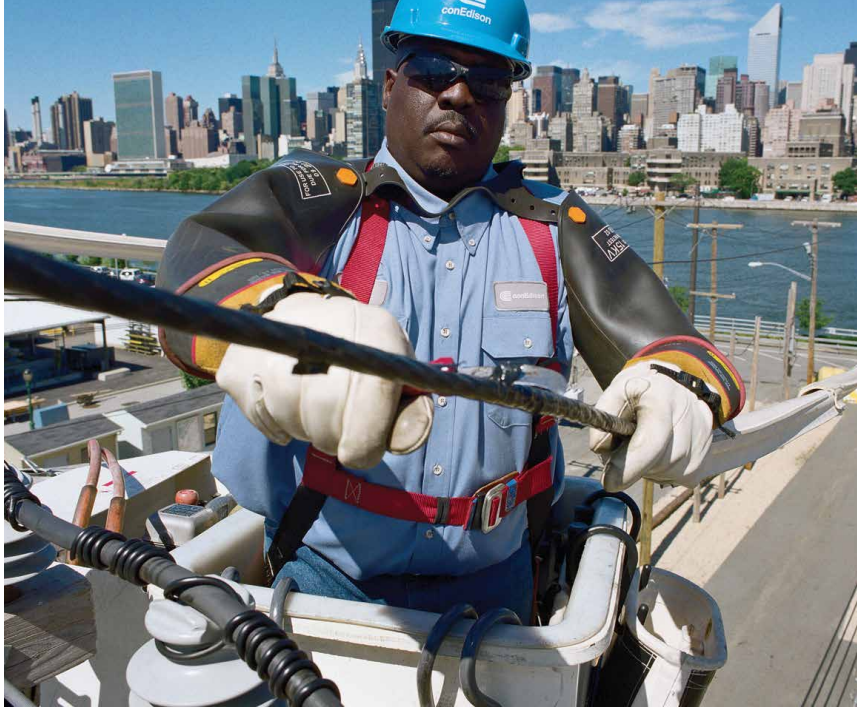
THE DIFFERENCE BETWEEN ARC RATED (AR) & FLAME RESISTANT (FR) FABRICS

By Scott Margolin
International Technical Director, Westex

There's a new abbreviation in the world of PPE, and it has been causing confusion, both among folks new to the subject, as well as those long familiar with FR clothing. AR (arc rated) made its debut in the recent revision of NFPA 70E. The difference between AR and FR?

In both cases, the primary purpose of the clothing is to resist ignition. If flammable clothing is ignited, the hazard to the wearer instantly becomes much greater. A clothing fire, which will last much longer than the initial hazard, will typically burn the victim over a much larger body surface area. By not continuing to burn after the initial hazard is over, FR clothing limits burn injury to, at most, only the body surface area directly impacted by the hazard. The second goal of FR clothing is to insulate the wearer from the thermal hazard, thus reducing or eliminating any second- or third-degree burn through the garments, even in areas directly impacted by the hazard. This is where arc rating comes in.

AR clothing is flame resistant, but not all FR clothing has been arc rated.



All arc rated clothing is flame resistant; the official arc rating standard (ASTM 1959) requires fabrics be FR to even qualify for testing. Once an FR fabric is submitted for arc rating, 21 samples are subjected to arc flash, and sensors measure heat transfer through the fabric. Stoll curve modeling then predicts whether or not a second-degree burn would result, and calculates the energy likely to cause a second-degree burn through that fabric 50% of the time. More simply put, arc rating measures insulation of FR fabrics to arc flash. The arc rating can be reported as ATPV (Arc Thermal Performance Value) or EBT (Energy Breakopen Threshold) and is a single number — the higher, the better.

The NFPA 70E committee wanted to encourage people to specify fabrics which have been tested specifically for the arc flash hazard, rather than accepting any FR fabric off the open market, and thus created the AR designation.

Since all AR garments are also FR, they will provide some measure of protection in a flash fire. Indeed, the significant majority of well-known AR fabrics are also offered for flash fire markets. However, arc rating is NOT a predictive factor in flash fire performance — the test standard for that is NFPA 2112. Fabrics pass this test if they record less than 50% second- and third-degree body burn in a three-second flash fire. The 2112 data is expressed as a percent body burn rather than calories, and in this test, the lower the number is, the better the fabric performs.

Again, all AR fabrics are flame resistant, but not all FR fabrics have been arc rated. While virtually all of the best-selling brands have been tested to both hazards, please make sure you specify and purchase fabrics tested for your hazards at independent labs.

“Performed as Designed”

By Larry Hilgeman
The Hilgeman Group, Inc.
www.thehilgemangroup.com

When it comes to arc flash incidents, we typically hear about the events that end tragically. But, it’s important to shed light on the incidents that end positively as a result of workers wearing the proper PPE. Opposite is an incident report from The Hilgeman Group that is a great example of how Westex UltraSoft® can help prevent serious injury.

THE HILGEMAN GROUP

With over 50 years of combined electrical safety experience, The Hilgeman Group, Inc. has emerged as one of the leaders in electrical arc flash safety training and consulting in North America.

With a reputation for providing world-class, eye-opening and common sense arc flash training, our instructors will forever change the way your employees approach electrical tasks.

Arc Flash Incident – Summary for the [redacted] Management Team and Corporate Legal Department

Location: [redacted], WI
Company: [redacted], Inc
Department: Assembly
Unit: Clamper #612

On August 6th, 2013 at approximately 3:30 PM, Mr. [redacted] (1st shift maintenance technician) was called to the Assembly Department due to a reoccurring problem with Clamper #612. The machine operator complained that the unit would randomly stop its normal cycle, appear to shut down, then re-energize and move to the neutral position. This issue occurred twice during 1st shift on August 6th and was reported to maintenance by the Assembly Department supervisor.

Mr. [redacted] proceeded to open the unit's control panel (480V 60A) to perform troubleshooting. After opening the control panel, as he was measuring line-side voltage, an arc flash occurred. The arc flash resulted in a relatively large fireball, a cloud of black smoke and an explosion-like sound. Witnesses in that area, upon seeing and/or hearing the explosion, quickly exited the building. During my investigation, some of the witnesses informed me they thought it was a forklift propane tank that exploded.

I was immediately contacted via the PA system and arrived at the site of the incident within 2–3 minutes. The maintenance technician involved in the incident, Mr. [redacted], was taken to the First Aid room for initial evaluation and observation.

My investigation revealed that Mr. [redacted] was wearing the required PPE associated with that control panel. The panel was classified and labeled as Hazard Risk Category 2 by The Hilgeman Group during their assessment in February 2013. As a result of his usage of the proper PPE, absolutely no personal injury resulted (other than some minor redness on his chest and forearms).

Upon inspection of the PPE, the UltraSoft® garments performed as designed. The shirt was badly scorched, but did not ignite or break open at all. The pants had minor scorch marks near the waist area, but were otherwise unremarkable. The gloves, face shield, etc., all performed as expected. All of the PPE worn at the time of this incident has been taken out of service and will be replaced. The Maintenance Manager intends to have the shirt mounted on the wall of the central maintenance shop as a reminder to his crew about the importance of wearing the proper PPE.

The actual root cause of the incident is still unknown. Our investigation continues. When completed, the full investigation report will be stored on the server in the Safety/2013/ Investigations folder.

Matt [redacted], CSP

EHS Manager

Note: Information from the report has been redacted to maintain confidentiality.

WESTEX IS A PROUD GOLD SPONSOR OF AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE)

For over 25 years, Westex has been a proud partner of the American Society of Safety Engineers. The ASSE is a global organization that represents over 35,000 members in 80 countries. As the world's oldest professional safety society, ASSE promotes safer work environments by preventing workplace fatalities, injuries and illnesses.

Throughout the organization's history, ASSE and its members have made many contributions to the safety, health and environmental (SH&E) profession through continuing education, publications and research. As a global advocate for SH&E professionals and the SH&E profession, ASSE brings a meaningful voice to the international discourse on occupational safety. Through outreach, advocacy, standards development and education, ASSE takes the lead in providing expertise and insight on occupational safety, health and environmental issues and practices. Also, by growing and sharing the profession's body of knowledge, ASSE fosters a global community among SH&E professionals.

"ASSE strongly emphasizes worker safety, and is proud to have Westex as a sponsor who shares the same philosophy. By committing to educating the industry, and by focusing on protecting people, Westex has shown that worker safety is an organizational value."

Kathy A. Seabrook CSP, CMIOSH, EurOSHM
ASSE President, 2013–2014

WESTEX IS PROUD TO PARTNER WITH NECA, NJATC AND IBEW

Westex is proud to be a five-time Premier Partner of The National Electrical Contractors Association (NECA). NECA allows contractors to exchange ideas and information as members come together to strengthen their industry and provide innovative energy solutions. Across the country, there are 119 local NECA chapters that work to develop effective labor agreements and market initiatives.

Westex is an eight-time Platinum Training Partner of the National Joint Apprenticeship and Training Committee (NJATC). The NJATC developed uniform standards that are adopted and used nationwide to select and train thousands of qualified men and women. Through the NJATC, the IBEW and NECA have hundreds of local programs offering apprenticeships and training in positions such as residential wireman, journey lineman, journey tree trimmer, journey inside wireman and telecommunication VDV installer-technician.

Westex is a partner in safety with the International Brotherhood of Electrical Workers (IBEW). The IBEW is the largest electrical union in the world. The IBEW represents workers' rights in all areas of the electrical industry.

Westex is committed to continuing a strong relationship in safety education and training with NECA, NJATC and IBEW. As the official sponsor of the NECA Safety Professionals Conference and the Safety Forum at the 2013 NECA Convention and Trade Show, we are pleased to present valuable insights on education and training for current safety and health changes, and FR program best practices.

ISHM
Institute for Safety and Health Management

2013 SAFETY MANAGEMENT PROFESSIONAL OF THE YEAR

Anita Falconetti

The Institute for Safety and Health Management has selected its 2013 Safety Management Professional of the Year. After deliberation and in-depth review, the selection committee unanimously agreed on Anita Falconetti. The committee cited her career growth and the results of her EHS management initiatives as driving factors in their decision.

Anita joined Bally Technologies, Inc., and after three years of extensive OSHA training, was promoted to Global Safety Coordinator. She is responsible for information, training, coordination and facilitation related to safety for the company worldwide. In this role, Falconetti provides guidance on best safety practices and procedures, and has developed and manages programs to ensure the safety of employees and compliance with OSHA and other local, state and federal regulations.

Anita is originally from Chicago and moved to Las Vegas in 2004. She is associated with the American Society of Safety Engineers, a Certified Safety Management Practitioner through ISHM and a Certified Safety & Health Practitioner with the State of Nevada.

Anita will receive this award in her hometown of Chicago in conjunction with the NSC Expo on September 30, 2013. The ceremony will take place at Soldier Field and is hosted by Westex.

Congratulations, Anita!

Westex and ISHM share a commitment to safety management and co-sponsor this annual award.

UP-TO-THE-MINUTE NEWS AND INSIGHTS

Connect with Westex on social media now!

Like us today to:

- Interact with other FR program managers
- Watch exclusive training and testing videos
- Get your FR program questions answered

Be the first to hear about:

- Exclusive events
- Product news
- Special giveaways

Follow Westex for:

- Internal company updates
- Interaction with our team
- In-depth product information

Get expert advice on:

- Implementing an FR clothing program
- Evaluating FR fabrics
- FR safety hazards and standards

Introducing:

Westex TrueComfort™ Flame Resistant Knit Fabrics

Westex TrueComfort™ is a new advancement in flame resistant knit fabrics.

The new TrueComfort™ fabrics are lightweight, soft and breathable, and offer the same guarantee of flame resistance for the life of the garments as Westex's proven UltraSoft®, UltraSoft AC® and Indura® brands. In addition, TrueComfort™ provides excellent arc flash protection with an Arc Rating of 8.9 (ATPV) for NFPA 70E HRC 2 performance and it is UL certified to NFPA 2112 for flash fire protection.

Any job functions that require arc flash and/or flash fire protection and extreme comfort such as maintenance and electrical work (NFPA 70E), electric and gas utilities personnel, electrical contractors, oil, gas and petrochemical workers, military personnel, and many others, can benefit from Westex TrueComfort™ knit fabrics.

WESTEX
TrueComfort™ Knits

FLAME RESISTANT INSIGHTS

Westex Tradeshows

Event Recap

ASSE

This past June, Westex exhibited at ASSE Safety 2013 in Las Vegas. There was a great turnout, and we are proud to be a gold sponsor of ASSE. Westex is looking forward to Safety 2014 in Orlando.

Upcoming Events

NSC & A+A

Come see us at Booth #1420 at the National Safety Council Congress & Expo in Chicago and Stand #3C36, at the A+A in Düsseldorf, Germany. Our world renowned safety expert, Scott Margolin, will be giving in-booth presentations on arc flash and flash fire hazards. While you're there, check out our new Westex TrueComfort™ knits, and experience the difference between UltraSoft® and other "88/12" fabrics.

Volume 02 Preview:

Look out for our next issue, featuring an in-depth exploration of the ramifications of heat stress and a close look at what happens during a flash fire.

Connect With Westex:

Have specific arc flash and flash fire concerns? Reach out to your regional manager for advice, or email insights@westex.com. We may feature your question in an upcoming edition of our eZine!

About Westex:

Established in 1919, Westex has nearly 100 years of experience in the textile industry, with over 50 years of experience manufacturing flame resistant fabrics. The Westex technology combines custom-engineered equipment with additional proprietary processing steps at nearly every stage of the engineering process. This superior technology led to the market-proven flame resistance guarantee for the life of the garment, making Westex a world leader in flame resistant fabrics. The popular Westex UltraSoft®, UltraSoft AC® and Indura® brands are specified by thousands of end users globally because of their proven track record of protection, comfort and value.

WHY SPECIFY A FABRIC BRAND?

The *SAFETY* of any flame resistant garment is in the *FABRIC.*

Many companies are selling FR garments today without disclosing the FR fabric manufacturer. Literally, dozens of imitation "88/12" FR fabrics have emerged in the marketplace recently, and they are *NOT "EQUAL."* Critical performance characteristics like arc rating, comfort, shrinkage control, garment wear life, FR durability to laundering, compliance to national and international standards and more are primarily dependent on the *BRAND* of flame resistant *FABRIC* used to make the garment. *Only Westex UltraSoft®, the #1 FR fabric brand in the world, delivers all of these benefits on a consistent basis — backed with decades of market-proven performance.*

DON'T ASSUME your garment is made with Westex UltraSoft® — SPECIFY and be sure!

Watch the live testing videos and compare fabric performance:

westex.com/fabricmatters

Follow us for the latest FR insights.