Protective Clothing Guide...

Tingley's protective clothing line utilizes four polymer coating categories for its liquid proof barriers. Various compound formulations within these polymer categories are used to meet specific performance requirements. The use of high purity Neoprenes and Urethanes along with high quality and specialty PVC coatings ensures the best products are available for the right applications.

Four fabrics in a variety of woven and non-woven construction, are used as substrates, bonded to the coating to add strength and comfort characteristics. Nylon, Polyester, Nomex, and Nomex/Kevlar fabrics when combined with the proper coating, result in cost effective material choices that provide the desired comfort, durability, and protection levels.

Coating and Substrate Selection:

Before choosing a material where contact with a given chemical may occur, the user should perform their own tests. If highly toxic chemicals are present, special care must be taken into consideration when choosing the correct protective product. This care should include daily inspections to ensure that normal wear and tear have not reduced the integrity of the product. Depending on the toxicity level of the chemical, products should be disposed of if intimate contact with the chemical has occurred.

Coatings: The compounds applied on the inner, outer or both sides of a fabric to make it waterproof and improve its physical performance. Each coating possesses its own unique formula and properties which dictate its performance in a given application.

Neoprene - A synthetic rubber, legendary for its toughness and durability. It is resistant to a broad range of animal fats and blood, oils, certain acids, alcohols, alkalies, caustics, and certain solvents. Available in: Magnaprene. **Page 18**

Polyurethane - A synthetic polymer that possesses excellent durability and abrasion characteristics, with a very light weight. Polyurethane provides excellent protection against animal fats and oils, is good in most hydrocarbon oils, organic acids, salts, alkalies, and in some inorganic acids. Available in: Iron Eagle, Eagle, and Stormflex. **Pages 17, 23**

PVC (Polyvinyl Chloride) - A synthetic thermoplastic polymer with a wide range of applications. PVC provides good protection against many acids, alcohols, alkalies, bases, oils, and petroleum hydrocarbons. Available in: American, Durascrim, Comfort-Brite, and most Economy products. **Pages 19, 21, 23, 24, 25**

Specialty PVC - Comprised of unique blends of high molecular weight PVC resins and specialty plasticizers. These additives significantly improve the coating's resistance to a variety of elements, enhancing their performance over regular PVC coatings in similar environments. Our Specialty PVC formulas show better resistance to many fats, acids, hydrocarbons, caustics, and other chemicals. Available in: Webdri, Safetyflex, and Electra. **Pages 19, 20, 22**

Substrates: The material or fabric on which a coating is applied. The material may be knitted, woven or non-woven. If the coating is applied on the outside of a non-woven substrate, the material may be referred to as a lining, however a lining may also be a separate layer of material sewn into the garment for added comfort. In the case of non-woven substrates, the high-loft polyester material used not only provides the wicking properties and comfort of a lining but also adds strength to the coated material. Any garment without a separate lining or non-woven substrate is often referred to as an unlined garment.

Nylon - Woven Nylon is popular for its lightweight, comfortable feel, along with its superior strength, toughness, and drying characteristics. Available in: Iron Eagle, Eagle, Magnaprene, Durascrim, and Storm-Champ. **Pages 17, 18, 21, 23**

Polyester - Polyester is known for its strength and mildew resistance along with its quick drying properties.

- Knit Polyester - Provides strength and stretch for added comfort. Available in: Safetyflex, Comfort-Brite, and select Economy products. **Pages 20, 23, 24, 25**
- Non-woven Polyester - High-loft substrates are utilized for their soft comfort and wicking properties. Non-wovens are generally not recommended in chemical applications where contaminants can wick and absorb into the fabric. Available in: Webdri and American. **Page 19**

Nomex - An aramid fiber which provides outstanding heat and flame resistance while possessing excellent thermal stability. This non-woven substrate maximizes protection and comfort. Available in: Electra. **Page 22**

Garment Construction:

Tingley protective clothing is constructed utilizing one of two seaming techniques/waterproofing methods. Different pattern design elements, such as sleeve cut and sizing, are incorporated to maximize fit and comfort when working. Suits utilize different hardware to meet both application and performance requirements.

Sleeve Design:

Batwing - This sleeve design is cut as part of the body material. The sleeve forms a 90 degree angle with the body of the jacket. This design provides additional material in the shoulder and underarm area, making the batwing sleeve a popular choice for the increased freedom of movement it allows when working. Available in: Iron Eagle, Magnaprene, Webdri, American, Safetyflex, DuraScrim, Comfort-Brite, Electra, and select Economy products. **Pages 17, 19, 21**

90° Raglan - A common sleeve design, the raglan sleeve is cut separate from the body and joined with the garment at a 90° angle, tapered from the neckline to the underarm. This construction reduces the material used in the sleeve area and offers less freedom of movement. Available in: Eagle and some Economy products. **Pages 17, 18, 20, 22, 23, 24, 25**

Waterproofing Methods:

Stitched and Taped - The process of sewing two materials together and then applying a tape under heat and pressure to waterproof the seam. The addition of the tape to the already stitched seam makes the seam stronger than the material itself. This method provides good waterproof protection and is acceptable for occasional chemical splash protection. It is generally not recommended for constant exposure to toxic chemicals because of the potential penetration of the needle holes and the absorption of the chemical by thread. Available in: Eagle and Magnaprene. **Pages 17, 18**

Therm-O-Rad Seams - The use of dielectric heat (high-frequency radio waves) and conventional thermal heat under pressure to fuse or form a molecular bond between two layers of coated fabric. This process achieves a 100% liquid proof seam. The Therm-O-Rad seam provides excellent chemical protection because there are no needle holes that chemicals may penetrate or threads that may absorb. Available in: Iron Eagle, Webdri, American, Safetyflex, DuraScrim, Electra, Comfort-Brite, and all Economy products. **Pages 17, 19, 20, 21, 22, 23, 24, 25**

Sizing:

All garments are generously cut to provide maximum freedom of movement. All Tingley garments feature graduated lengths. The additional length added to each garment helps reduce the need for custom sizing for taller individuals. Not only do our garments provide a better more comfortable fit, they reduce the number of sizes required to fit a work force. For the dimensions and sizing recommendations for specific garments, please refer to our sizing chart.

SIZING

JACKETS

Sizes	S	M	L	XL	2XL	3XL	4XL	5XL
Chest Size	36-38	40-42	44-46	48-50	52-54	56-58	60-62	64-66
Garment Chest Measurement	46	50	54	58	62	66	70	74
Jacket Length	29	30	31	31	32	32	32	33
Sleeve Length	33	34	34½	35	35½	36	36	38

OVERALLS OR PANTS

Sizes	S	M	L	XL	2XL	3XL	4XL	5XL
Waist	32-34	36-38	40-42	44-46	48-50	52-54	56-58	60-62
Garment Inseam	28	29	30	31	32	32	32	33

COATS

Size	S	M	L	XL	2XL	3XL	4XL
Chest Size	36-38	40-42	44-46	48-50	52-54	56-58	60-62
Garment Chest Measurement	46	50	54	58	62	66	70
Coat Length	48	48	48	48	48	48	48
Sleeve Length	33	34	34½	35	35½	36	36

Hardware: Our protective clothing features two types of snaps.

Plastic or Delrin Snaps - Used on all of our flame resistant garments. All snaps are 24 linge high resin plastic and are non-conductive and non-corrosive. Available in: Eagle, Safetyflex, DuraScrim, Electra, Comfort-Brite, and select Economy products. **Pages 17, 20, 21, 22, 23, 24, 25**

Heavy Duty Nickel-Brass Snaps - Used with nylon caps on our non-flame resistant garments and are guaranteed not to corrode. Their unique assembly method alleviates the problem of snaps pulling apart or through material, which may render perfectly good suits useless. These snaps stand up to heavy abuse and are great in food processing where metal detection systems are used. Available in: Iron Eagle, Magnaprene, Webdri, American, and select Economy products. **Pages 17, 18, 19, 23, 24**

Standards Testing:

Many of our protective clothing products are utilized in harsh environments and are required to pass industry standards and test methods. Three clothing standards are referenced in this brochure, they are: ASTM D6413 for Flame Resistant Rainwear, ASTM F1891 for Arc Thermal Performance, ANSI/ISEA 107 for High Visibility. Where referenced, Tingley products meet or exceed the minimum requirement set for the standard.

ASTM D6413 for Flame Resistance of Textiles - This is a test method that determines whether rainwear is flame resistant or not. A vertical flame test exposes a material to a 12 second calibrated, open flame. After the flame source is removed the material must self extinguish. There are no specific time requirements for this flame-out to occur however, Tingley adheres to the industry standard for industrial protective clothing which is a flame-out and afterglow less than 2 seconds. This standard pertains to workers who are required to wear flame resistant clothing. Available in: Eagle, Safetyflex, Magnaprene, DuraScrim, Electra, Comfort-Brite. **Pages 18, 20, 21, 22, 25**

ASTM F1891 for Arc and Flame Resistant Rainwear - This standard specification defines test methods and sets minimum requirements for material performance, in electrical arc environments. This standard is primarily utilized in the electric utility industry. Available in: Electra. **Page 22**

ANSI/ISEA 107 for High Visibility Safety Apparel - This standard specifies requirements for apparel, capable of signaling the user's presence visually and intended to provide conspicuity of the user in hazardous situations under any light conditions by day and under illumination by vehicle headlights in the dark. Performance requirements are included for color, retroreflection, and minimum areas, as well as the recommended configuration of the materials. Test methods are provided to help ensure that a minimum level of visibility is maintained when garments are subjected to ongoing care procedures. Available in: Electra, and Comfort-Brite. **Page 22, 25**