

 *UltraSoft*<sup>®</sup>  *UltraSoft AC*<sup>®</sup>  *Indura*<sup>®</sup>

**Flame Resistant Protective Clothing Fabric**

# **CARE, USE AND MAINTENANCE GUIDE**

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## Description of Fabrics

Since 1987, garments made of UltraSoft®, UltraSoft AC® and Indura® fabrics have been used by various industries for personal protection against thermal exposures from molten ferrous metals, flash fire, electrical arc and other exposures in the workplace. The UltraSoft® and Indura® fabric lines include:

***Westex UltraSoft AC® 88% Pima Cotton/ 12% High Tenacity Nylon Woven Blends***

***Westex UltraSoft® 88% Cotton/ 12% High Tenacity Nylon Woven Blends***

***Westex UltraSoft® 88% Cotton/ 12% High Tenacity Nylon Knit and Fleece Blends***

***Westex Indura® 100% Cotton Wovens and Knits***

UltraSoft®, UltraSoft AC® and Indura® fabrics are specifically engineered to be flame resistant secondary protective fabrics. More specifically, as described in ASTM F1002, primary protective clothing, such as a firefighter's outer gear, is worn for work activity "during which significant exposure to molten substance splash, radiant heat and flame is likely to occur." Secondary protective clothing, such as garments made from UltraSoft®, UltraSoft AC® or Indura® fabrics, are "designed for continuous wear for work activities in designated locations in which intermittent exposure to molten substance splash, radiant heat and flame sources is possible."

The flame resistance of UltraSoft®, UltraSoft AC® or Indura® fabrics is achieved by an engineering process proprietary to Westex. This finish has been designed to withstand the most rigorous laundering conditions anticipated for proper cleaning of work clothing. A flame retardant polymer is embedded in the fabric in a fashion that will withstand multiple launderings normally required of such garments. **In fact, Westex guarantees the flame resistance of garments made from UltraSoft®, UltraSoft AC® or Indura® fabrics for the useful life of those garments when proper care procedures are employed.**

The thermal protective properties of any flame resistant fabric can be compromised by the presence of contaminants on the fabric. Even though the original fabric is fully flame resistant as measured by standard test protocols, flammable contaminants on garments can ignite and burn until consumed, thereby increasing heat transfer to the wearer and leading to flame resistance failure. Garments must be laundered thoroughly to remove contaminants. It is recommended to wash garments prior to wearing.

The procedures described in this guide have been utilized effectively for removing industrial soiling and other contaminants while maximizing garment wear life. Users of garments constructed of UltraSoft®, UltraSoft AC® or Indura® fabrics should ensure that the techniques they use achieve similar results by performing their own tests and/or working with Westex.

# Commercial Laundering — Westex® Woven Fabrics

## *Detergent and Supplemental Chemicals*

### WASHING DETERGENT SUPPLIES

A variety of commercial and industrial detergent formulations are available for processing cotton and cotton rich garments, and have been used for a number of years. **Appendix I** offers a list of chemical suppliers. In recent years, detergents designed for use at wash temperatures of 140°F (60°C) or less such as high surfactant, low alkalinity products have gained some popularity, and have no adverse effect on UltraSoft®, UltraSoft AC® and Indura® woven fabrics. It is important to use a detergent and wash temperature that is sufficient to thoroughly clean the soiled clothing, even considering supplemental alkalinity and higher wash temperatures, where appropriate. Use of a detergent with a phosphate builder has proven highly beneficial for laundering UltraSoft®, UltraSoft AC® and Indura® flame resistant fabrics. The best results in cleaning and utilization of detergent supplies are obtained when using softened water. UltraSoft®, UltraSoft AC® and Indura® fabrics can be washed at temperatures up to 165°F (75°C).

### ALKALINITY

Detergents used commercially have pH values ranging from 9–13, and in most instances, are effective in removing dirt and oil from soiled garments. In instances requiring more aggressive soil and oil removal, higher wash temperatures and supplemental alkalinity should be considered. If softened water is not available, we recommend against the use of silicate supplemented detergents. UltraSoft®, UltraSoft AC® and Indura® fabrics are not adversely affected by high pH, however, the effect on colorfastness of garments should be checked

to maintain an acceptable balance between cleanliness and color retention.

### SOFTENERS

We recommend against the use of a supplemental softener, except in unique circumstances that are specifically described to us and that are tested for impact on flame resistance.

### STARCH

We recommend against the use of starch or other hand builders, except in unique circumstances that are specifically described to us and that are tested for impact on flame resistance.

## *Detergents and Supplemental Chemicals to Avoid*

### CHLORINE BLEACH

**Chlorine bleach (sodium hypochlorite) must not be used on garments made with UltraSoft®, UltraSoft AC® and Indura® fabrics, either separately or in detergents.** Chlorine bleach can adversely affect the flame resistance of the fabric. Review of various laundry advisories generally prohibits the use of chlorine bleach for protective fabrics of any fiber composition.

### HYDROGEN PEROXIDE BLEACH

**Hydrogen Peroxide, which is an oxygen bleach, must not be used on garments constructed of UltraSoft®, UltraSoft AC® and Indura® fabrics, either separately or in detergents.** The presence of metals with hydrogen peroxide can adversely affect the flame resistance of the fabric.

# Commercial Laundering — Westex® Woven Fabrics

## SOAPS

**The use of soaps (salts of fatty acids) is not recommended for laundering garments made with UltraSoft®, UltraSoft AC® and Indura® fabrics.** Soaps can form insoluble scums with hard water that are deposited on the fabric. Soap scums may be flammable and can adversely affect the thermal protection performance of the garment if they burn.

## *Recommended Washing/ Drying Procedures*

It is recommended that garments be washed and dried inside out. This will minimize surface abrasion and aid in maintaining the surface appearance of garments constructed of UltraSoft®, UltraSoft AC® and Indura® fabrics.

## WASHING PROCEDURES GENERAL FORMULA

The exemplar formula in **Appendix II** provides complete operational steps for commercially laundering garments constructed of UltraSoft®, UltraSoft AC® and Indura® fabrics. The actual conditions used should be selected from this formula based on the degree of soiling and other factors to be considered for the garments being processed. Not all steps need to be followed for lightly soiled garments. To improve soil removal and minimize redeposition, a “multi add” procedure is recommended. Consult with the chemical supplier (**Appendix I**) for assistance with the quantity of supplies and specific conditions to be used for your specific case.

## LOADING WASHER

Garments made with UltraSoft®, UltraSoft AC® and Indura® fabrics can be washed in a variety of wash formulations depending on the degree

and type of soil. UltraSoft®, UltraSoft AC® and Indura® fabrics should be washed with other UltraSoft®, UltraSoft AC® and Indura® fabrics. Be sure that UltraSoft®, UltraSoft AC® and Indura® fabrics are clearly identifiable. Care should be exercised in mixing light and dark colors, as well as heavy and light soil items in the load.

Normal washer loads are generally set at 80% of washer capacity for 100% cotton garments, however, loading at 65% will provide better cleaning for heavily soiled items.

## WASH TEMPERATURE

The range of wash temperatures suggested take into account various degrees of soiling. The higher the temperatures, the better the cleaning for heavily soiled garments. However, compatibility of wash temperature with the detergent used should be checked. The maximum wash temperature for UltraSoft®, UltraSoft AC® and Indura® fabrics is 165°F (74°C).

## COLORFASTNESS OF GARMENTS

Wash temperatures higher than 165°F (74°C) may affect the washfastness (color loss) of certain colors. Likewise, the presence of sodium perborate in the wash system will significantly affect the shade of certain naphthol dyes.

## RINSING

As for all washed garments, UltraSoft®, UltraSoft AC® and Indura® fabrics must be adequately rinsed to remove wash chemicals and to lower the pH to that of the water supply. To minimize washer-induced wrinkles, water temperature is reduced in each succeeding rinse cycle until the last operation (sour) where it should be 100°F (38°C) or lower.

# Commercial Laundering — Westex® Woven Fabrics

## SOUR

When laundering garments constructed of UltraSoft®, UltraSoft AC® and Indura® fabrics, the use of a sour operation after thorough rinsing is strongly recommended. The primary effect of sour is to reduce the fabric's pH from the alkaline detergents used for cleaning for the clear benefit of reducing the possibility of dermatological reactions from high pH. No adverse effect on flame resistance results from the use of acid sour.

Residual alkalinity in any garment can cause skin irritation and other problems. To ensure that all traces of wash chemical alkalinity are neutralized, sour can be added to the final rinse cycle in the wash wheel. Garments constructed of UltraSoft®, UltraSoft AC® and Indura® fabrics should not be rinsed further after the sour is added. Overuse of sour should be avoided because it will result in highly acidic fabrics. Any standard or buffered sour is acceptable for use with UltraSoft®, UltraSoft AC® and Indura® fabrics.

## DRYING AND FINISHING

UltraSoft®, UltraSoft AC® and Indura® fabrics can be dried and finished using normal methods for cotton fabrics available to laundries. It is important from the viewpoint of garment shrinkage that cotton garments not be overdried in any step of the operation. Overdrying has been determined to be the main cause of excessive garment shrinkage.

## TUMBLE DRY CONDITIONING/FINISHING

In many instances, tumble dry conditioning is the only finishing necessary for garments constructed of UltraSoft®, UltraSoft AC® and Indura® fabrics. Tumble dry conditioning can be done prior to wet-on-dry tunnel finishing (see section below) or pressing. For best results, tumble driers should not be

overloaded. Dry fabrics efficiently at stack temperatures between 140°F (60°C) and 165°F (74°C). Garment temperature measured in the basket should not exceed 280°F (138°C). Do not overdry fabrics, or excessive shrinkage will occur. If possible, remove garments made with UltraSoft®, UltraSoft AC® and Indura® fabrics from dryer when slightly damp (about 10% moisture) and hang to dry or tunnel process. Garments should not remain in a hot tumbler when not in motion.

## WET-TO-DRY TYPE TUNNEL DRYING/FINISHING

Wet garments from the wash wheel or partially dry tumble dried garments can be finished by hanging on a hanger, and passing through a tunnel containing forced air supplied at 300°F (149°C) dry bulb and 190°F (80°C) wet bulb at a rate just sufficient to completely dry the garments. Garment temperature should not exceed 280°F (138°C). Again, do not overdry.

## DRY-TO-DRY TYPE TUNNEL DRYING/FINISHING

This process is not recommended for fabrics constructed of UltraSoft®, UltraSoft AC® and Indura® fabrics. Should the operational flow of your plant require passage through the tunnel, we recommend using the wet-to-dry procedure or passing fully tumble-dried garments through the tunnel at ambient air temperature.

## PRESSING

Depending on individual preferences, garments constructed of UltraSoft®, UltraSoft AC® and Indura® fabrics may require pressing. If pressing is required, the conditions employed for pressing cotton blended fabrics are acceptable for garments made with UltraSoft®, UltraSoft AC® and Indura® fabrics. Pressing does not adversely affect the flame resistance of the fabric.

# Home Laundering — Westex® Woven Fabrics

## GENERAL GUIDELINES

Garments constructed of UltraSoft®, UltraSoft AC® and Indura® woven fabrics can be washed and dried by conventional home method followed by hand ironing, if desired. No special technology is needed for home laundering.

Home procedures may not remove the last traces of very heavy, widespread or ground-in soils, which may be flammable and could adversely affect the performance of UltraSoft®, UltraSoft AC® and Indura® fabrics. If home laundering does not remove contaminants or contaminant build-up, garments can be periodically dry cleaned or commercially laundered. When UltraSoft®, UltraSoft AC® and Indura® fabrics are contaminated by hazardous materials, only commercial or on-site laundering should be used with the appropriate wastewater treatment techniques.

The following procedures can help provide optimum cleaning and maintenance of protective apparel:

## *Detergents and other Laundry Products*

### WASHING DETERGENT SUPPLIES

A wide variety of detergents are available for household use. A list of detergents acceptable for use with UltraSoft®, UltraSoft AC® and Indura® fabrics is provided in **Appendix III**. It is important to use a detergent and wash temperature that is sufficient to thoroughly clean soiled clothing.

Washing detergents not recommended for use with UltraSoft® and Indura® fabrics are listed in **Appendix IV**.

## OTHER LAUNDRY PRODUCTS

Laundry products such as fabric softeners and starches present a complex situation relative to use with all flame resistant garments washed at home. Since it is impossible to examine and control each product and procedure that might be used, we recommend that such products not be used.

## USE OF SOFTENED WATER

For best cleaning results and the preservation of protective characteristics, an adequate supply of soft water is recommended for laundering garments constructed of UltraSoft®, UltraSoft AC® and Indura® fabrics. Hard water contains salts, such as calcium and magnesium, that combine with other salts and fatty based soaps to form insoluble deposits, film, scum and crud in the wash process and can deposit on the fabric. These contaminants are difficult to rinse from the fabric and may mask the flame resistance. Using soft water reduces detergent consumption, improves the quality of washing and avoids adverse effects on flame resistance. For more specific details, see **Appendix V** for information about water hardness and its effect on home laundering.

## *Detergents and Supplemental Chemicals to Avoid*

### CHLORINE BLEACH

**Chlorine bleach (sodium hypochlorite) must not be used on garments made of UltraSoft®, UltraSoft AC® and Indura® fabrics, either separately or in detergents.** Chlorine bleach can adversely affect the flame resistance of the fabric. Review of various laundry advisories generally prohibits the use of chlorine bleach for protective fabrics of any fiber composition.

## Home Laundering — Westex® Woven Fabrics

### HYDROGEN PEROXIDE BLEACH

Hydrogen peroxide, which is an oxygen bleach, must not be used on garments made with UltraSoft®, UltraSoft AC® and Indura® fabrics, either separately or in detergents. The presence of metals with hydrogen peroxide can adversely affect the flame resistance of the fabric.

### SOAPS

The use of soaps (salts of fatty acids) is not recommended for laundering garments constructed of UltraSoft®, UltraSoft AC® and Indura® fabrics. Soaps can form insoluble scums with hard water that are deposited on the fabric. Soap scums may be flammable, and can adversely affect the thermal protection performance of the garment if they burn.

### *Washing/Drying Procedures*

It is recommended that UltraSoft®, UltraSoft AC® and Indura® fabrics be washed and dried inside out. This will minimize surface abrasion and aid in maintaining the surface appearance of garments constructed of UltraSoft®, UltraSoft AC® and Indura® fabrics.

### SORTING

Garments made with UltraSoft®, UltraSoft AC® and Indura® fabrics should be sorted by color — light colors washed with light colors and dark with dark — to avoid dye transfer. UltraSoft®, UltraSoft AC® and Indura® fabrics should be washed with other UltraSoft® and Indura® fabrics.

### PRETREATING

Stains, as well as deep soil lines on the collars and cuffs of garments, are more readily removed if pretreated. Stains should be pretreated at the earliest opportunity and sufficient time allowed for the pretreatment material to penetrate and loosen the soil. The heavily soiled or stained areas should be rubbed with a full-strength, heavy-duty liquid detergent or any off-the-shelf laundry pretreatment product. Such pretreatment products should not contain bleach or hydrogen peroxide, either separately or in combination with detergent.

### LOAD SIZE

When laundering garments constructed of UltraSoft®, UltraSoft AC® and Indura® fabrics, it is important not to overload the machine. To ensure a cleaner wash and avoid setting wash wrinkles, the load size must permit clothes to move freely through the wash water and rinse cycle. Regardless of the machine's rated capacity in pounds, bulk — not weight — should be the limiting factor.

### WASH TEMPERATURE

Heavily soiled garments made with UltraSoft®, UltraSoft AC® and Indura® fabrics should be washed using the “hot” water temperature setting. Garments with lesser degrees of soil can be laundered with lower water temperatures, which also will be beneficial in retaining garment color.



## Home Laundering — Westex® Woven Fabrics

### TUMBLE DRYING

Garments made with UltraSoft®, UltraSoft AC® and Indura® fabrics can be tumble dried or air-dried following washing. For tumble-drying, drying time should be carefully controlled so that garments are removed from the drier immediately when dry or when slightly damp. Damp garments may be hung to complete drying. Overdrying will result in excessive shrinkage. Drying times will vary depending on the load size and the relative weight of the garments being dried. Use of the “Permanent Press” setting on the dryer provides a beneficial cool down cycle.

### IRONING

Depending on individual preferences, garments constructed of UltraSoft®, UltraSoft AC® and Indura® fabrics may require pressing. A steam or dry iron may be used on the cotton blend setting. Ironing has no adverse effect on the flame resistance properties of the fabrics.

## Westex® UltraSoft® and Indura® Knit and Fleece Fabrics

UltraSoft® and Indura® flame resistant fabrics are also available in knit and fleece styles. Because of their construction, knit and fleece fabrics exhibit a higher potential for shrinkage through the laundry and drying processes, and thus, need to be processed slightly different than woven products.

### ***Commercial Laundering UltraSoft® and Indura® Knit and Fleece Fabrics***

Industrial laundering is generally not recommended for garments constructed of UltraSoft® and Indura® knit and fleece fabrics. However, there may be conditions that may be adequate for industrial processing of UltraSoft® and Indura® knit and fleece fabrics. Westex should be consulted by the processor and processor's chemical supplier(s) on a case-by-case basis.

### ***Home Laundering UltraSoft® and Indura® Knit and Fleece Garments***

#### **GENERAL GUIDELINES**

Garments constructed of UltraSoft® and Indura® knit and fleece fabrics can be washed and dried by conventional home methods. No special technology is needed for home laundering UltraSoft® and Indura® knit and fleece fabrics.

Home procedures may not remove the last traces of very heavy, widespread or ground-in soils, which may be flammable and could adversely affect the performance of garments made with UltraSoft® and Indura® knit and fleece fabrics. If home laundering does not

remove contaminants or contaminant build-up, garments can be periodically dry-cleaned. When garments made with UltraSoft® & Indura® fabrics are contaminated by hazardous materials, only commercial or on-site laundering should be used with the appropriate wastewater treatment techniques.

The following procedures can help provide optimum cleaning and maintenance of protective apparel:

### ***Detergents and Other Laundry Products***

#### **WASHING DETERGENT SUPPLIES**

A wide variety of detergents are available for household use. A list of detergents acceptable for use with garments made with UltraSoft® and Indura® knit and fleece fabrics is provided in **Appendix III**. It is important to use a detergent and wash temperature that is sufficient to thoroughly clean soiled clothing.

Washing detergents not recommended for use with UltraSoft® and Indura® knit and fleece fabrics are listed in **Appendix IV**.

### ***Other Laundry Products***

Laundry products such as fabric softeners and starches present a complex situation relative to use with all flame resistant garments washed at home. Since it is impossible to examine and control each product and procedure that might be used, we recommend that such products not be used.

#### **USE OF SOFTENED WATER**

For best cleaning results and the preservation of protective characteristics, an adequate supply of soft water is recommended for

## Westex® UltraSoft® and Indura® Knit and Fleece Fabrics

laundering garments constructed of UltraSoft® and Indura® knit and fleece fabrics. Hard water contains salts, such as calcium and magnesium, that combine with other salts and fatty based soaps to form insoluble deposits, film, scum and crud in the wash process, and can deposit on the fabric. These contaminants are difficult to rinse from the fabric and may mask the flame resistance. Using soft water reduces detergent consumption, improves the quality of washing and avoids adverse effects on flame resistance. For more specific details, see **Appendix V** for information about water hardness and its effect on home laundering.

### ***Detergents and Supplemental Chemicals to Avoid***

#### **CHLORINE BLEACH**

**Chlorine bleach (sodium hypochlorite) must not be used on garments made with UltraSoft® and Indura® knit or fleece fabrics, either separately or in detergents.** Chlorine bleach can adversely affect the flame resistance of the fabric. Review of various laundry advisories generally prohibits the use of chlorine bleach for protective fabrics of any fiber composition.

#### **HYDROGEN PEROXIDE BLEACH**

**Hydrogen peroxide, which is an oxygen bleach, must not be used on garments constructed of UltraSoft® and Indura® knit or fleece fabrics, either separately or in detergents.** The presence of metals with hydrogen peroxide can adversely affect the flame resistance of the fabric.

#### **SOAPS**

**The use of soaps (salts of fatty acids) is not recommended for laundering garments made with UltraSoft® and Indura® knit or fleece fabrics.** Soaps can form insoluble scums with hard water that are deposited on the fabric. Soap scums may be flammable and can adversely affect the thermal protection performance of the garment if they burn.

### ***Washing/Drying Procedure***

It is recommended that garments be washed and dried inside out. This will minimize surface abrasion and aid in maintaining the surface appearance of garments constructed of UltraSoft® and Indura® knit and fleece fabrics.

#### **SORTING**

Garments made with UltraSoft® and Indura® knit and fleece fabrics should be sorted by color — light colors washed with light colors and dark with dark — to avoid dye transfer. UltraSoft® and Indura® knit and fleece fabrics should be washed with other UltraSoft® and Indura® knit and fleece fabrics.

#### **PRETREATING**

Stains, as well as deep soil lines on the collars and cuffs of garments, are more readily removed if pretreated. Stains should be pretreated at the earliest opportunity and sufficient time allowed for the pretreatment material to penetrate and loosen the soil. The heavily soiled or stained areas should be rubbed with a full-strength, heavy-duty liquid detergent or any off-the-shelf laundry pretreatment product. Such pretreatment products should not contain bleach or hydrogen peroxide, either separately or in combination with detergent.

## Westex® UltraSoft® and Indura® Knit and Fleece Fabrics

### LOAD SIZE

When laundering garments constructed of UltraSoft® and Indura® knit and fleece fabrics, it is important not to overload the machine. To ensure a cleaner wash and avoid setting wash wrinkles, the load size must permit clothes to move freely through the wash water and rinse cycle. Regardless of the machine's rated capacity in pounds, bulk — not weight — should be the limiting factor.

### WASH TEMPERATURE

Heavily soiled garments made with UltraSoft® and Indura® knit and fleece fabrics should be washed using the “warm” water temperature setting. Garments with lesser degrees of soil can be laundered with lower water temperatures, which also will be beneficial in retaining garment color.

### TUMBLE DRYING

Garments made with UltraSoft® and Indura® knit and fleece fabrics can be tumble dried or air dried following washing. For tumble-drying, drying time should be carefully controlled so that garments are removed from the dryer immediately when dry or when slightly damp. Damp garments may be hung to complete drying. Overdrying will result in excessive shrinkage. Drying times will vary depending on the load size and the relative weight of the garments being dried. Use of the “Knit” or “Gentle” setting on the dryer provides a beneficial cool down cycle.

### IRONING

Depending on individual preferences, garments constructed of UltraSoft® and Indura® knit and fleece fabrics may require pressing. A steam or dry iron may be used on the cotton blend setting. Ironing has no adverse effect on flame resistance properties of UltraSoft® and Indura® knit and fleece fabrics.

UltraSoft® and Indura® knit and fleece fabrics may be dry-cleaned. Recommendations in Chapter 5 should be followed for garments made with UltraSoft® and Indura® knit and fleece fabrics.

## Dry Cleaning

Dry cleaning of garments constructed of UltraSoft®, UltraSoft AC® and Indura® fabrics is desirable for effective removal of greases and oils that are not easily removed by home or commercial laundering. Dry cleaning will not adversely affect the flame resistance of UltraSoft®, UltraSoft AC® and Indura® fabrics. Care should be taken to maintain the solvent in a clean condition to avoid soil redeposition. Thorough removal of all traces of dry cleaning solvent from garments is recommended. Dry cleaning is not recommended for denim garments for reasons of color loss. Dry cleaning may not be as effective as wet washing in removing body soils and odors. After five dry cleanings, a water wash is recommended to offset this problem.

## Maintenance of Garments Made with Westex® Fabrics

In order to perform its protective function, a garment must be maintained in its original condition. Rips, tears, cuffing and thin spots are normal consequences of use and they should be repaired or restored as soon as possible. Garments should be repaired utilizing like materials and thread. For advice on proper repair techniques, contact your uniform service provider or clothing manufacturer.

To obtain additional, useful information on the care and maintenance of flame resistant garments, **consult the following industry publications:**

- **ASTM F1449** — *Standard Guide for Industrial Laundering of Flame, Thermal, and Arc Resistant Clothing*
- **ASTM F2757** — *Standard Guide for Home Laundering Care and Maintenance of Flame, Thermal and Arc Resistant Clothing*
- **NFPA 2113** — *Standard on Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire*

## Situations to Avoid in the Use of Clothing Made of UltraSoft<sup>®</sup>, UltraSoft AC<sup>®</sup> and Indura<sup>®</sup> Fabrics

### DO NOT USE FOR PRIMARY PROTECTIVE CLOTHING

Garments made from UltraSoft<sup>®</sup>, UltraSoft AC<sup>®</sup> or Indura<sup>®</sup> fabrics should not be used for primary protective clothing, such as a firefighter's outer gear. Rather, they should only be used for secondary protective clothing, as recommended by ASTM F1002.

### DO NOT USE FOR PRIMARY CHEMICAL SPLASH PROTECTION

UltraSoft<sup>®</sup>, UltraSoft AC<sup>®</sup> and Indura<sup>®</sup> flame resistant fabrics are designed for use in secondary protective clothing. The fabric is engineered to be flame resistant, where the fabric will self-extinguish when the source of ignition is removed. These fabrics are not designed to offer chemical splash protection. Other personal protective equipment, such as impermeable products, should be used in situations requiring chemical splash protection.

### DO NOT USE IN THE PRESENCE OF STRONG ACIDS, OXIDIZERS OR REDUCERS

The flame resistant polymer contained in UltraSoft<sup>®</sup>, UltraSoft AC<sup>®</sup> and Indura<sup>®</sup> fabrics is highly resistant to most acids, bases and solvents. Exposure to strong acids, such as hydrochloric or sulfuric, however, may degrade the strength of the cotton fiber and even cause holes in the fabric. Additionally, these fabrics should not be exposed to strong oxidizers, such as bleach (over 6% sodium hypochlorite) and hydrogen peroxide, and strong reducers, such as sodium hydrosulfite. Strong oxidizing and reducing agents can cause an adverse reaction with the flame resistant polymer.

## Appendix I

### ***Suppliers List: Laundry Supplies***

#### **DIAMOND CHEMICAL CO., INC.**

Union Ave. & DuBois St.  
P.O. Box 7428  
East Rutherford, NJ 07073  
(800) 654-7627  
Fax: (201) 935-6997  
www.diamondchem.com

#### **DOBER GROUP**

11230 Katherine's Crossing  
Woodridge, IL 60517  
(630) 410-7300  
Fax: (630) 410-7444  
www.dober-group.com

#### **ECOLAB INC., TEXTILE CARE DIVISION**

Ecolab Center  
370 N. Wabasha  
St. Paul, MN 55102  
(800) 553-8683  
Fax: (651) 225-3185  
www.ecolab.com

#### **GURTLER CHEMICALS, INC.**

15475 South LaSalle St.  
South Holland, IL 60473  
(800) 638-7300  
(708) 331-2550  
Fax: (708) 331-9087  
www.gurtler.com

#### **NORCHEM CORP**

5649 Alhambra Ave.  
Los Angeles, CA 90003  
(800) 442-4360  
Fax: (323) 227-8733  
www.norchemcorp.com

*Note: Listing of suppliers in this appendix does not indicate a Westex endorsement. Other suppliers not listed in this appendix may also have acceptable products for washing UltraSoft®, UltraSoft AC® and Indura® garments.*

For additional information, contact:  
**Uniform and Textile Service Association**  
**1501 Lee Highway**  
**Suite 304,**  
**Arlington, VA 22209**



## Appendix II

### **Generalized Wash Procedure\* for Woven UltraSoft®, UltraSoft AC® and Indura® Fabrics**

<b>OPERATION</b>	<b>WATER LEVEL</b>	<b>WATER TEMP</b>	<b>TIME (MIN)</b>	<b>SUPPLIES**</b>
Flush	High	140–165° F (60–75° C)	3	
Break***	Low	140–165° F (60–75° C)	10-20	2.5–3 lbs (1.1–1.4 kg) Detergent****
Carry over	Low	140–165° F (60–75° C)	3-5	
Suds	Low	140–165° F (60–75° C)	5-7	1.25–1.5 lbs (0.5–0.7 kg) Detergent****
Rinse	High	140–165° F (60–75° C)	2	
Rinse	High	135° F (57° C)	2	
Rinse	High	120° F (49° C)	2	
Rinse	High	105° F (41° C)	2	
Sour	Low	100° F (38° C)	5	1–4 oz Ammonium Silicofluoride or Sodium Silicofluoride

\* Load size 65% – 80% of capacity

\*\* Consult chemical suppliers (**Appendix I**) for acceptable supplies for flame resistant garments. Supply quantities stated for 100 lb (45 kg) of garments.

\*\*\* Best results are obtained with softened water. When softened water is not available, we recommend against the use of silicate supplemented detergents.

\*\*\*\* Where possible, the use of a detergent with a phosphate builder has proved beneficial for laundering UltraSoft®, UltraSoft AC® and Indura® flame resistant fabrics.

## Appendix III

### ***Acceptable Consumer Detergents***

The following products are acceptable for use with UltraSoft®· UltraSoft AC® and Indura® fabrics.

<b>DETERGENTS</b>	<b>SPOT CLEANERS</b>
All	Shout
Arm & Hammer	Spray & Wash
Cheer	Zout
Era	
Gain	
Purex (powder & tablets)	
Select Ultra	
Surf	
Tide, Tide w/ Bleach Alternative (powder, liquid & tablets)	
Wisk	
Xtra	

Note: Best cleaning results are obtained with soft water.

Note: This is not a complete list of all detergents that are acceptable for use with UltraSoft®, UltraSoft AC® and Indura® fabrics. Additional brands are acceptable provided they do not contain chlorine bleach or hydrogen peroxide.

## Appendix IV

### ***Do Not Use These Products With UltraSoft® and Indura® Garments***

**Tide with Bleach (Liquid)**

**Chlorox II (Liquid)**

**Vivid (Liquid)**

Note: These products contain either chlorine bleach or hydrogen peroxide. This list is not a complete list of all products containing either chlorine bleach or hydrogen peroxide. Therefore, it is important to check the ingredients of all products before using with UltraSoft® and Indura® fabrics.

## Appendix V

### ***Additional Information on the Effect of Water Hardness***

#### **WATER HARDNESS**

Calcium and magnesium are the primary minerals that contribute to water hardness. The greater the concentration of these minerals, the harder the water. Hard water does not clean as effectively as soft water.

Hardness is measured in grains per gallon (gpg) or parts per million (ppm). Water containing less than 3.5 gpg is considered soft, whereas water with more than 7 gpg is considered hard. (See Table 1 for the American Society of Engineers' water hardness classifications.)

#### **WATER HARDNESS CLASSIFICATION**

	<b>GRAINS PER GALLON</b>	<b>PARTS PER MILLION</b>
<b>SOFT</b>	0 to 3.5	0 to 60
<b>MODERATE</b>	3.6 to 7.6	61 to 120
<b>HARD</b>	7.1 to 10.5	121 to 180
<b>VERY HARD</b>	More than 10.5	More than 180

Hard water affects laundering in several ways. Incomplete soil removal is common in hard water. As unremoved soil deposits accumulate, fabrics feel harsh and stiff.

There are three ways to help control water hardness when doing the laundry:

- Use adequate amounts of an appropriate detergent.
- Use water as hot as recommended for the fabric.
- Install a water-softening unit in your home.