

Protective Clothing

**I.  
Policy and Purpose**

It is the policy of the Waco Fire Department that all personnel conduct themselves in a manner that reduces or eliminates accidents and injuries resulting from the non-use or improper use of protective clothing.

The policies, information, and standards provided in this procedure apply to all Waco Fire Department personnel.

The information provided in this procedure will be used to determine the following:

- A. Definition of full protective clothing
- B. Definition of other protective clothing
  - 1. Structure fire fighting gear
  - 2. Aircraft Rescue Fire Fighting (ARFF) proximity gear
  - 3. Wildland fire fighting gear
  - 4. Extrication gear
  - 5. Vertical rescue gear
  - 6. Goggles/Safety glasses
  - 7. Safety vests
- C. Selection of protective clothing
- D. Inspection of protective clothing
- E. Repair/replacement & retirement criteria
- F. Record keeping
- G. Storage requirements
- H. When personnel shall be required to wear protective clothing

- I. Responsibilities of the department, station officers, and each individual employee

**II.  
Definitions and Descriptions**

Full protective clothing shall consist of helmet, hood, gloves, coat, pants and boots. All of these elements must comply with the appropriate NFPA standards. A brief description of each item is provided below:

- A. Helmets shall include a shell, face shield and hardware, impact cap, suspension assembly, liner and earflaps, adjustable headband, personnel initials, and reflective tape.
  - 1. No other decals, lettering, or accessories shall be added.
  - 2. ARFF helmets are to be covered with an aluminized shell covering.
  - 3. Helmets used for extrication, confined space, and vertical rescue must be approved by the Waco Fire Department.
- B. Hoods shall be Nomex with a full bib.
- C. Gloves shall be leather with a moisture barrier and Nomex wristlets\*.
  - 1. \*Personnel wearing coats with over the thumb wristlets may use gauntlet style gloves.
  - 2. Personnel wearing coats without over the thumb wristlets must use traditional style gloves with long wristlets.
  - 3. ARFF gloves shall be aluminized covered
  - 4. Extrication, confined space, and vertical rescue gloves must be

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approved by the Waco Fire Department.

oversee the process of selecting or field testing ensemble elements.

- D. Coats and Trousers shall consist of an outer shell, moisture barrier, thermal liner, and reflective trim. (ARFF coats do not have reflective trim).
- E. Boots shall be poly-rubber with felt lining, steel toe, steel mid-sole, and yellow trim. Leather boots must meet the requirements of NFPA 1971.
- F. Wildland fire fighting gear must be Nomex III A material.
- G. Goggles and safety glasses must meet requirements of ANSI Z87.1.
- H. Safety vests must meet the standards of ANZI/SEA 107 Class II.

This committee should be able to set and define goals plus provide recommendations to those that have the final decision. A rating system evaluation form will be developed in consideration of each element(s). Items that should be considered but are not limited to the following: a) heat stress, b) weight of garment, c) design of garment, d) style of garment, e) interface, f) durability, g) comfort, h) flexibility, i) performance, j) price, k) customer service, l) delivery, m) compliance, n) reliability, and o) warranty.

In conducting field test participants should be selected based on representation of a general cross-section of personnel, willingness to participate, objectivity, and level of operational activity. Participants should be fitted for each element being evaluated.

An evaluation form should be developed for each element and interface area to evaluate the field test results. The form should include a rating system including but not limited to the following: a) specific time of test, b) ease of movement, c) ability to work, and d) size and fit issues.

Participants should fill out three evaluation reports independently. After gathering reports in a timely manner, the department should analyze the results.

**These items shall not be altered or modified in any way; and shall be worn, inspected, and maintained in accordance with the manufactures instructions and the standards and instructions found in this procedure. Do not remove labels sewn or attached onto any element. This is a Texas Commission on Fire Protection (TXCFP) requirement.** Helmets, coats, and pants consist of multiple components. It is important to understand that all of the components must be in place for these items to provide the intended protection.

III. Selection

IV. Inspections

Periodically there may arise a need to establish a committee of personnel within the department that have a broad cross-section of experience to

There shall be three types of inspections:

- 1. Routine
- 2. Monthly
- 3. Advanced

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Each individual shall perform a **Routine Inspection** of their personal elements after each use. After each use shall include each time the element(s) have been exposed or suspected of having been exposed to damage or contamination.

Routine inspections shall include the following for any element considered:

1. Soiling
2. Any type of contamination
3. Physical damage
4. Damaged or missing components

Notification of routine inspections shall be given to the officer in charge. Element(s) found to be defective or in unserviceable condition shall be removed from service and repaired/replaced. The officer in charge will normally notify the Training Division of the problem. During weekends or after normal business hours notify the Assistant Chief of any problems.

The officer in charge at each station shall also conduct a **Monthly Inspection** of protective clothing elements on the first Monday of each month. A copy of the evaluation shall be sent to the Training Division as soon as completed. Elements shall be inspected for:

- Identification (name or initials on gear)
- Cleanliness
- Completeness
- Physical damage
- Anything that compromised safety

Elements for Monthly Inspection shall be inspected as follows:

A. Coats

1. Soiling

2. Contamination
3. Physical damage
4. Damaged or missing reflective trim
5. DRD (Drag Rescue Device)

B. Trousers

1. Soiling
2. Contamination
3. Physical damage
4. Damaged or missing reflective trim

C. Hoods

1. Soiling
2. Contamination
3. Physical damage
4. Loss of face opening adjustment

D. Helmets

1. Soiling
2. Contamination
3. Physical damage to the shell
4. Physical damage to the ear flaps
5. Damaged or missing components
6. Damaged or missing reflective trim

E. Gloves

1. Soiling
2. Contamination
3. Physical damage
4. Shrinking
5. Loss of flexibility

F. Boots

1. Soiling
2. Contamination
3. Physical damage
4. Loss of water resistance

Other protective gear that requires routine inspection but are exempt from requirements of record keeping are:

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### G. Wildland Fire Fighting Gear

1. Soiling
2. Contamination
3. Physical damage

### H. Goggles/Safety Glasses

1. Scratches
2. Pitting
3. Crazed lens

### I. Safety Vests

1. Soiling
2. Contamination
3. Physical Damage (especially to reflective material on vests.)

**Advanced inspections** shall be conducted every 12 months, or whenever routine or monthly inspections indicate a problem. Findings shall be documented on an inspection form and a copy sent to the Training Division as soon as possible after inspections are completed.

Elements for Advanced Inspections shall be inspected as follows:

#### A. Coats

1. Soiling
2. Contamination
3. Physical damage
4. \*Loss of moisture barrier integrity
5. Seam integrity
6. Material integrity
7. Wristlets
8. Reflective trim
9. Label integrity
10. Closure systems
11. Accessories
12. DRD (Drag Rescue Device)

#### B. Trousers

1. Soiling

2. Contamination

3. Physical damage

4. \*Loss of moisture barrier integrity

5. Seam integrity

6. Material integrity

7. Wristlets

8. Reflective trim

9. Label integrity

10. Closures systems

11. Accessories

- 12.

#### C. Hoods

1. Soiling

2. Contamination

3. Physical damage

4. Shrinkage

5. Elasticity

6. Seam integrity

#### D. Helmets

1. Soiling

2. Contamination

3. Physical damage

4. Damage to the ear flaps

5. Damaged or missing components

6. Suspension system functional

7. Face shield/goggles damaged and functional

8. Damaged or missing reflective trim

#### E. Gloves

1. Soiling

2. Contamination

3. Physical damage

4. Shrinkage

5. Loss of flexibility

#### F. Boots

1. Soiling

2. Contamination

3. Physical damage

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- 4. Loss of water resistance
- 5. Excessive tread wear
- 6. Condition of lining

Employees will be required to turn in an element to receive a new element.

Minor repairs to garments shall be done in a manner using materials that are approved by the manufacturer. Field repairs to thermal liners shall be permitted providing there is no stitching through the moisture barrier

\*Requires an annual leak test to be conducted on June 1 of each year. Test results to be turned into the Training Division as soon as possible after leak tests are complete.

Leak test shall be conducted using the following method:

- 1. Place the liner of a flat surface with dry thermal barrier facing down and the dry moisture barrier facing up.
- 2. Find an area that is subject to stress or high abrasion (shoulder, knee, seat of pants).
- 3. At room temperature, pour about 1/2 cup of water on the moisture barrier and wait approximately two minutes.
- 4. If the mixture passes through the moisture barrier and wets the thermal barrier, the liner needs replacement.

All repairs to the moisture barrier or any major repairs to the outer shell shall only be performed by the manufacture or the manufacturers recognized repair facility.

Retirement criteria shall be comprised but not limited to of the following:

- 1. Overall condition
- 2. Specific deterioration beyond repair
- 3. Inability to remove contaminants
- 4. Age and experience of element

Disposal of any element shall be in accordance with City of Waco salvage/surplus policy.

V.

Repair/Replace and Retirement

Procedures for handling and custody of elements that are directly related to serious fire fighter injuries and fatalities shall be as follows:

The actual repair/replacement and retirement of any element shall require a request from the officer in charge to the Training Division

The Department will repair/replace items that are worn or damaged as a result of the normal wear and tear associated with the work assignment. Employees may be required to repair or replace items that are lost, stolen, damaged, or prematurely worn out as a result of personal negligence.

Unless noted otherwise in the procedure, elements will be replaced on an exchange basis.

- 1. Immediate removal from service and preservation of all elements of protective clothing worn by the injured or deceased fire fighter. Custody shall be maintained at a secure location.
- 2. All elements shall be tagged and stored in paper or cardboard containers. Plastic or airtight containers shall not be used.
- 3. Review of the personal elements by qualified members of the organization or outside experts will be performed to determine the condition thereof.

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**Section VI.**

**Cleaning Procedures for Protective Clothing Elements**

Protective clothing elements must be kept clean and shall be cleaned as often as deemed necessary by the individual or the officer in charge. At a minimum, elements that have been issued, used, and are soiled shall receive advanced cleaning every six months. Advanced cleaning is a thorough cleaning accomplished by washing them with cleaning agents, which usually requires elements to be taken out of service. Advanced cleaning can be accomplished by hand washing in a utility sink, machine washing, or contract cleaning.

Normally elements that require advanced cleaning and have not been cleaned and documented within the six-month period shall be subject to advanced cleaning during the months of April and October.

Specialized Cleaning involves specific procedures and specialized agents or processes to remove hazardous materials or biological waste. In some cases, advanced cleaning can accomplish the same functions as specialized cleaning, such as in the removal of body fluids.

In addition, any element(s) must be cleaned before any repairs can be accomplished.

There are three types of cleaning procedures:

1. Routine
2. Advanced
3. Specialized

**Routine cleaning** procedures shall be as follows:

1. Initiate cleaning at the incident scene
2. Brush off any dry debris

3. Gently wash off debris with a hose
4. Scrub gently with a soft brush and rinse again if necessary
5. Spot clean if necessary

**Advanced cleaning** procedures shall be as follows:

A. Coats and Trouser

1. Must be washed separately from other garments
2. Personnel should wear disposable rubber gloves while engaged in the cleaning process.
3. Separate the thermal liner and the outer shell and wash separately (wash outer shells together, etc.) **ARFF outer shell must be hand washed. Do not put into washing machine.**
4. Remove the Drag DRD from the coat before laundering either the device or coat.
5. Prior to washing, heavily soiled elements should be spot cleaned or pre-treated. Garments can be spot cleaned or pre-treated by applying liquid detergent directly onto the soiled area(s). Gently rub the fabric together until light foam appears on the surface.
6. All hooks and dees should be fastened and the garment turned inside out.
7. One coat and one pant, or two coats, or two pants can be washed in a large capacity (16 gallon) top loading or front loading washing machine using the following procedures:
  - a. While the washing machine is filling with hot water (temperature between 120°F and 130°F) add ½ cup (approximately 4 oz.) of liquid detergent. **Do not use chlorine bleach.**

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- b. The washing machine should be programmed from double rinse, or a complete second cycle can be run without adding detergent. Double rinsing is necessary to ensure the removal of any residual dirt or detergent.
- c. Remove the garments from the washing machine and dry by hanging on a line in a well-ventilated shaded area (garments should not be dried or stored in direct sunlight). **No machine drying is allowed on any element.**
- d. Rinse the washing machine thoroughly by running it through two complete cycles with detergent.

8. Some examples of products that may be used for washing, spot cleaning, and pre-treatment are as follows:
- a. Detergents: Liquid Wisk, Liquid Tide, Liquid, Cheer, and Liquid Fab.
  - b. Spot cleaning and pre-treatment: Liquid Spray and Wash, Liquid Shout, Liquid Tide

B. Hoods

- 1. Hoods can be washed using a mild liquid detergent and dried in a shaded area using natural ventilation.

C. Helmets

- 1. Helmet shells and components can be cleaned with a mild detergent and water.
- 2. If stronger cleaning agents are required, use Formula 409, Joy, Mr. Clean, or Windex.
- 3. Dry in a shaded area using natural ventilation.

D. Gloves

- 1. Gloves can be hand-washed using a mild detergent.

- 2. Dry in a shaded area using natural ventilation.

E. Boots

- 1. Boots can be cleaned using a mild detergent and rinsed with water.
- 2. Dry in a shaded area using natural ventilation.

F. Wildland Gear

- 1. Wildland gear can be washed using a mild detergent.
- 2. Dry in a shaded area using natural ventilation.

G. Goggles/Safety Glasses

- 1. Clean using a mild detergent
- 2. Dry with a clean, soft cloth.

H. Safety Vests

- 1. Safety vests can be washed using a mild detergent.
- 2. Dry in a shaded area using natural ventilation.

**Specialized cleaning** procedures shall be as follows:

- 1. Universal precautions should be observed when handling elements known or suspected to be contaminated.
- 2. Elements that have been soiled with body fluids shall follow the Exposure Control Plan for Blood Borne Pathogens (SOP 902.0).
- 3. When dealing with hazardous materials or biological agents, the contaminate will be identified by the department, if possible. When the contaminate is identified, the department shall consult the manufacturer of the contaminant for appropriate decontamination agent or processes.

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VII.

Record Keeping- Ensemble/Elements

The Waco Fire Department will compile and maintain records of fire fighting ensemble/elements. Personnel will also be responsible for certain individual records.

The Texas Commission on Fire Protection (TXCFP) under Senate Bill 382 has set forth in Section 435.1(4) that elements in use or contracted prior to 01/01/02 are exempt from requirements in NFPA 1851, §2.3

Elements that are issued after the contracted period must fall under the new law. The following records shall be kept for each ensemble element (coat, trouser, hood, helmet, gloves, and boots.

1. Person to whom element is issued
2. Date/condition when issued
3. Manufacturer and model name or design
4. Manufacturer's ID number, lot number or serial number
5. Month and year of manufacture
6. Dates and findings of Advanced Inspections
7. Dates of Advanced Cleaning or decontamination
8. Reason for Advanced Cleaning or decontamination
9. Dates of repair, who performed repair, and brief description of repairs
10. Date of retirement
11. Date and method of disposal

When new structural fire fighting ensembles and elements are issued, instructions on care, use, and maintenance from the manufacture shall be provided to the individual. If the instructions

issued by the manufacture differ from any item listed in this standard operating procedure, the manufacturer's instructions shall be followed.

VIII.

Storage of Ensembles/Elements

In order to adequately protect ensembles and elements correctly, personnel must adhere to specific requirements.

1. Ensembles/elements shall not be stored in direct sunlight while not being worn
2. Ensembles/elements shall be dry and clean before storage.
3. Storage areas will be well ventilated, clean, and dry.
4. Ensembles/elements shall not be stored in air-tight containers
5. Soiled ensembles/elements shall not be stored inside living quarters or with personal belongings, or taken or transported within the passenger compartment of personal vehicles
6. Ensembles shall not be stored in contact with hydraulic fluids, hydrocarbons or hydrocarbon vapors, or other contaminants.

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IX.

Proper Use of Protective Clothing

The protective clothing elements described in this procedure are designed and intended primarily for use during structural fire fighting operations. However, fire fighters often encounter other situations in which the protection provided by these items is desirable.

Therefore, all members are expected to exercise good judgment and wear, or require to be worn, the protective clothing items appropriate for the hazard being faced. In making these decisions a very conservative approach must be taken, considering not only the immediate or reported hazard, but the potential hazards as well.

The criteria provided below may not cover every situation, but are comprehensive enough to serve as guidelines for those situations not specifically described. Remember that the objective is to be safe. If in doubt about wearing an item wear it.

A. Full protective clothing as defined in Section II of this procedure shall be worn in the following situations:

- 1. While responding to all reported fires, rescues, investigations, motor vehicle accidents, extrications, and certain hazardous materials incidents. The following exceptions apply:
  - a. Personnel driving apparatus
  - b. Personnel assigned to rescue boats
  - c. Personnel responding in staff vehicles
  - d. When a company is "on the air" and is dispatched to a call, personnel shall remain seat-belted and not attempt to don protective clothing in a moving apparatus. Personnel shall have the option:

- to don protective clothing upon arrival at the emergency scene;
- to bring the apparatus to a complete stop, don protective clothing, and then respond to an alarm.

- e. Helmets are not required to be worn in vehicles equipped with "David Clark" type systems, while these systems are in use.
- 2. While participating in operations at the scene of all fires, including vehicle fires and dumpster fires attacked with hand lines. The following exceptions apply:
  - a. Coats and hoods may be removed when the officer in charge of the incident declare the atmosphere and structure safe.
  - b. Structural fire fighting protective clothing may be worn while operating at grassfires; however the protection provided is usually excessive and can contribute to heat stress. Wildland fire fighting gear should be worn as necessary to provide protection based on the particular grass fire.
- 3. In any fire situation that requires the actual use or anticipated use of any SCBA.
- 4. During any form of live fire training or any other training exercise that would require the same level of protection under normal operating conditions.
- 5. When inspecting a damaged natural gas meter or line, when plugging a broken line, or when standing by with hose lines in the hazard area as utility employees repair a broken line.
- 6. When standing by with hose lines in the hazard area at a MVA or fuel spill.
- 7. During vehicle extrication. Personnel assigned to operate hydraulic rescue equipment may wear the Nomex Wildland

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gear, instead of structural coats and trousers.

- 8. When operating power saws, forcible entry equipment and tools, and other power tools.
- 9. At hazardous materials incidents when deemed appropriate by the haz-mat incident commander or until determined otherwise.
- 10. While operating at an incident scene, or in any location where a potential hazard could be anticipated
- 11. Anytime the incident commander or officer in charge deems it necessary.

B. Individual items of protective clothing shall be worn in the following situations:

1. Hand Protection

- a. Fire fighting gloves shall be worn during any emergency operation where personnel need maximum hand protection when exposed to the threat of fire, chemicals, and/or blood-borne pathogens.
- b. Personnel on EMS calls directly involved with patient care shall wear latex gloves, and personnel directly involved with fire suppression or extrication shall wear fire fighting or extrication gloves.
- c. Personnel involved in extrication, confined space, or vertical rescue shall wear gloves recognized as department issue.

2. Head and Face Protection

- a. In addition to goggles or safety glasses, fire helmets with a face shield shall be worn while operating power tools during any emergency operation or training exercise.

- b. Safety glasses or goggles and latex gloves shall be required during power tool maintenance at the stations.
- c. Personnel on EMS calls should use N95 particulate mask and/or eye shields as needed for personal protection.

3. Turnout Gear:

- a. Protective clothing shall be worn during training exercises as required for actual emergency operations;
- b. Turnout gear shall be required while operating power and extrication tools during emergency operations

4. Hearing protection shall be utilized when operating in environments with high noise levels. Personnel operating power tools and other equipment that create high noise levels shall also wear hearing protection. Exception: Personnel operating in emergency operations will use reasonable care to provide hearing protection. Examples of hearing protection devices:

- a. Ear muffs
- b. Ear plugs
- c. David Clark headset systems
- d. Incident commanders, company officers, and designated safety officers must continually monitor the situation and reduce or increase levels of protections as circumstances or hazards change. OIC's must use their experience and judgment in situations where exceptions to these criteria appear necessary. Such as when the use of protective clothing may compromise patient care, or when it is necessary to operate in close quarters where full protective clothing cannot be worn.

5. Safety Vests

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- a. Safety vests shall be worn by ALL Waco Fire Department Personnel while working on or near any public roadway. Examples:
  - (1) All personnel at traffic accidents.
  - (2) Chiefs, Chief Aides, Engineers, and approved riders at hazardous materials incidents, structure fires or any incident where safety is concerned.
  - (3) Officers in Charge must use their experience and judgment in situations where exceptions to these criteria appear legitimate.

(Note):

A possible exception would pertain to rehab and salvage operations where the scene is secured safely by Waco Fire Department personnel and trucks and/or Waco Police Department personnel and vehicles.

X.

Drag Rescue Device (DRD)

The purpose of the DRD is to aid firefighters with the rescue of a firefighter that is incapacitated by dragging the firefighter along a horizontal plane. It is intended to assist in pulling or dragging an incapacitated firefighter. It is not designed nor tested to use in a vertical rescue operation. It is not an escape harness or for lifting or lowering a person on a lifeline.

The proper use of the DRD is as follows:

- 1. Locate the web hand loop beneath the flap on the upper back of the coat shell.
- 2. Insert a hand through the web hand loop and grasp firmly.

- 3. Pull the web hand loop to eliminate slack in the DRD.
- 4. Drag the incapacitated firefighter from the life-threatening environment.

After deployment or washing, the handle loop must be reset inside the coat using the following instructions:

- Separate the liner from the shell at the sleeve cuffs
- Lay the coat on a flat surface with the exterior side down and the liner facing you
- Pull the liner sleeves out of the outer shell sleeves and fillip the liner over the top of the shell exposing the inner surface of the shell
- Place the DRD on the shell with the label facing downward. The opposite end of the DRD should be at the top of the coat, just below the slit opening
- Spread the upper portion of the harness into a partial circle, with the straps to the outside of the shell sleeves
- Flip the upper portion of the liner back down over the top part of the shell. Reinsert the liner sleeves into the shell sleeves
- Pull the label end of the harness up to the slit opening; the handle should pass over the top of the opposite end of the harness.
- Push the handle through the slit opening
- Pull the rest of the liner back down over the shell

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- Adjust the DRD strap so it is around the body panel side of the seam that attaches the sleeve liner at the shoulder
- Snap the liner back into place at the front facings, sleeve ends and hem
- Verify that the hand loop is inserted through the shell opening. Secure the Velcro tab and cover the handle with the flap

*John D. Johnston*  
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