
	<b>Standard Operating Procedures</b>	
	<b>SOP 37</b>	
	<b>Subject: Structural Firefighting Personal Protective Equipment</b>	
	<b>Approval Date: 01/2019</b>	
	<b>Date Created: 01/2019</b>	
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<b>Approved By: Fire Chief/Fire Marshal Brent Hahn</b>		

**POLICY REFERENCE:** Through adoption of Texas Commission on Fire Protection (TCFP) SECTION 435.1. (3) Protective Clothing, National Fire Protection Association (NFPA) 1971 and NFPA 1851, Selection, Care and Maintenance Program for Structural Fire Fighting Protective Ensembles, it is the goal of the Kemah Fire Department (KFD) to protect our Assigned Department Personnel by providing a Personal Protective Equipment (PPE) that is appropriate for the hazards they are expected to encounter.

### 37.01 Purpose

The purpose of this Standard Operating Procedure is to establish a program for structural firefighting bunker coats, bunker pants, boots, gloves, helmets, and protective hoods to reduce the safety and health risks associated with these items when they are poorly maintained, contaminated or damaged.



### 37.02 Scope

1. This document complies with TCFP 37 TAC 435.1(3), NFPA 1851 Standard on Selection, Care and Maintenance of Protective Ensembles for Structural Fire Fighting.
2. This document describes the program parts, establishes program procedures and assigns roles and responsibilities to all KFD Firefighting Personnel for implementing and maintaining the program.
3. It is the objective of the program to provide protective ensembles that are appropriate for their intended use.
4. It is the objective of the program to set requirements for the proper handling, care, maintenance and retirement of protective ensembles.

### 37.03 Program

#### 37.03.1 Program Parts

The program consists of the following parts:

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- The compilation and maintenance of records Protecting the public and personnel from contamination
- The selection process related to structural and proximity firefighting ensembles Inspection for soiling, contamination and damage
- Cleaning and decontamination
- Repairing damaged ensembles
- Storage while on duty and off duty Retirement, disposition and special incident procedure

Kemah Fire Department will outside companies and vendors for parts of the program.

PPE CARE  
2650 Old Louetta Loop #8  
Spring, Texas 77388  
(Ph): 832-668-0488

The above listed company will provide:

1. Advanced Inspection (*37.05.03 Advanced Inspection and Complete Liner Inspection*)
2. Complete Liner Inspection (*37.05.03 Advanced Inspection and Complete Liner Inspection*)
3. Cleaning and Decontamination (*Section 37.06 Cleaning and Decontamination*)
4. All Garment Repairs (*Section 37.07 Repairs*)

The above listed company has been verified by a third-party certification organization for performing Advanced Inspection, Advanced Cleaning and Garment Repairs. A copy of the above company's' verification certificate is filed at their office listed above and at KFD.

### **37.03.02 Records**



Records will be kept for all Structural Firefighting Protective Equipment in use. This includes all protective coats, pants, hoods, helmets, gloves and boots permanently assigned to uniformed personnel, as well as items available for temporary use.

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Kemah Fire Department's Standard Operating Procedures

Revised by Joe Murray, Deputy Fire Marshal  
Approved by Brent Hahn, Fire Chief/Fire Marshal

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At time of issue, an assigned Fire Officer will record in the department’s computer database: Person to whom the element is issued Date and condition when issued Manufacturer and model name Manufacturer’s identification number Month and year of manufacture

While in use, all maintenance events will be recorded.

Assigned Personnel will record into the Department’s data base system upon sending to Gear Cleaning Solutions: Date(s) sent, and contractor used for services reason for services

PPE Care will be responsible for records pertaining to the services they provide.

These include:



- Date(s) and findings of advanced inspections
- Dates(s) and findings of advanced cleaning or decontamination
- Date(s) of repair(s) and description of repair(s)

After items have reached their useful life per criteria established in this document (reference Section 8.2), the Assigned Personnel will record into the Departments Database system: Person to whom the element is issued Date of retirement Date and method of disposal.

All records will be kept on file for 12 months after the item has been retired, and then stored for a minimum of 5 years or in compliance with the State of Texas Requirements.

### 39.03.03 Manufacturer’s Instructions

1. Manufacturer Care and Use Manuals are attached to all new NFPA 1971 compliant structural firefighting protective equipment.
2. When issuing new protective equipment, assigned personnel will provide the Assigned Department Personnel to whom they have been issued with the Care and Use Manual.
3. Manufacturer care and maintenance instructions must be followed.
4. A reference copy of the Manufacturer Care and Use Manual will be available at the KFD Watch Office.

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*It is the responsibility of the uniformed personnel to read Manufacturer Care and Use Manuals.*

### **39.03.04 Protecting the Public and Personnel from Contamination**

Structural Firefighting Protective Equipment:

- that has been determined to be soiled or contaminated must be removed from service and cleaned or decontaminated prior to being returned to service.
- must not be worn or stored in fire department living quarters.
- must not be taken home, washed at home or washed in public laundries.
- the public must not be exposed to potentially soiled or contaminated Structural Firefighting Protective Equipment except during emergency operations.

### **39.03.05 Reporting Personal Protective Equipment Health and Safety Concerns**



Shift Lieutenant should fill out a report when a KFD Personnel notifies them of a protective equipment health and safety concern and forward the report to the Administrative Team.

Assigned Command Staff Personnel must report in writing all known or suspected element failures to the manufacturer and the certification organization.

### **37.04 Selection**

#### **37.04.01 Administrative Team**

1. An Administrative Team will be established to manage the process of selecting ensemble and ensemble elements.
2. The Administrative Team will consist of two (2) Command Staff Personnel who have knowledge of Personal Protective Equipment and applicable NFPA standards.
3. The Administrative Team will be appointed and overseen by the KFD Fire Chief/Fire Marshal.

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### 37.04.02 Risk Assessment

Before starting the selection process, the Administrative Team will perform a risk assessment. The Administrative Team will determine the best method for sourcing, compiling and evaluating the information.

The risk assessment must include as a minimum:

- Types of duties performed
- How often personal protective equipment is used
- Operational strategy and tactics
- Geographical location and climate
- Emergency hazards and product experiences likely to be encountered KFD Personnel

The risk assessment must be documented for later reference and/or review.

### 37.04.03 Field Evaluation



After evaluation of the risk assessment, the committee will contact manufacturers for participation in a field evaluation. The committee will inform manufacturers of the performance requirements and any preferences in design or fabric composition.

Test participants will be selected based on:

- Willingness to participate
- Objectivity Level of Operational Activity
- Position within the department
- Age and gender

Field Evaluation Process:

1. Participants will test each model of each manufacturer under consideration.
2. The committee will establish the duration of the field evaluation.
3. The committee will address any fit issues before the test begins.
4. Upon conclusion, the committee will analyze the results.

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### 37.04.04 Specifications

The purchase specifications will indicate the committee’s choices for the following required NFPA 1971 ensemble element components:

Garments Outer shell material:

- Fabric, weight, color
- Thermal liner material
- Moisture barrier material: substrate, film or coating
- Trim: configuration, material, color
- Closure system Wristlets: material, design

Hoods Material

- Face opening design

Gloves Composite materials

- Wristlet or gauntlet Wristlet material



Helmets Material

- Color Retention System
- Trim color and configuration
- Ear cover material and dimension
- Eye protection

Boots Composite materials

The specifications can also include other performance requirements or features such as:

1. Design or style requirements
2. Customizations such as pockets, areas of enhanced insulation, lumbar support systems, etc. Weight reduction Interface requirements and coat hem rise
3. Custom size requirements

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4. Other requirements deemed important by the committee

Other items that can be included in the specification include manufacturer requirements such as warranty, references, or service requirements such as cleaning, inspection and repair.

**37.05 Inspection**

**37.05.01 General Information**

The purpose of inspection is to determine whether personal protective equipment has soiling, contamination or damage that makes it unsafe for use or could eventually result in making it unsafe for use.

When appropriate, universal precautions must be used.

If personal protective equipment is found to be soiled or contaminated, it must be cleaned or decontaminated before further inspection. Guidelines for determining whether ensemble elements should be cleaned are in *37.06.02 Routine Cleaning*.

**37.05.02 Routine Inspection**



Routine inspection is the responsibility of each assigned of the Kemah Fire Department Fire Department Personnel who has been issued personal protective equipment.

Routine inspection must be performed after each use and after each exposure to an event that could result in soiling or damage.

Performing a brief inspection before the start of each duty day is encouraged.

Protective coats and pants should be inspected for the following:

- Soiling Contamination
- Physical Damage Rips, tears and cuts
- Damaged or missing hardware and closures
- Thermal damage

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- Damaged or missing trim Seams becoming un-sewn and missing or broken stitches
- Correct assembly of shell, liner and
- Drag Rescue Device (DRD)

DRDs should be inspected for the following:

- Installation in coat
- Soiling Contamination
- Physical damage
- Cuts, tears, punctures, cracking or splitting
- Thermal damage
- Seams becoming un-sewn and missing or broken stitches



Hoods should be inspected for the following:

- Soiling Contamination
- Physical damage
- Rips, tears and cuts
- Thermal damage Stretching or elongation of the face opening
- Seams becoming un-sewn and missing or broken stitches

Helmets should be inspected for the following:

- Soiling Contamination Physical damage to the shell
- Cracks, crazing, dents and abrasion
- Thermal damage
- Physical damage to the earflaps
- Rips, tears and cuts
- Thermal damage
- Damaged or missing components of the suspension and retention systems
- Damage or missing components of the face shields or goggles
- Damaged or missing reflective trim



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- Seams becoming un-sewn and missing or broken stitches

Gloves should be inspected for the following:

- Soiling Contamination
- Physical damage Rips, tears and cuts
- Thermal damage Inverted liner
- Shrinkage Loss of flexibility and/or loss of elasticity of the wristlet
- Seams becoming un-sewn and missing or broken stitches



Boots should be inspected for the following:

- Soiling Contamination
- Physical damage
- Cuts, tears and punctures
- Thermal damage
- Exposed or deformed steel toe, steel midsole or shank
- Loss of water resistance
- Closure damage or not functioning
- Seams becoming un-sewn and missing or broken stitches

Additionally, interface components should be inspected to ensure that they continue to provide proper interface.

Assigned Department Personnel who suspect that a problem exists should inform their Shift Lieutenant. The Shift Lieutenant should send an email to the Administrative Team which includes the Assigned Department Personnel name, the serial number of item and the issue observed to request an advanced inspection.

### **37.05.03 Advanced Inspection and Complete Liner Inspection**

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Advanced inspections will be conducted at a minimum of every 12 months, or whenever routine inspections indicate that a problem exists. A complete liner inspection will be performed along with the advanced inspection on all structural firefighting coats and pants that have been in service for two years or more.

KFD has contracted with PPE Care (Listed previously in the SOP) for the provision of advanced cleaning and inspection services. Annual advanced cleaning and inspection will be coordinated by the Shift Lieutenant for that specific shift or an appointee of the Administrative Team.

Each Assigned KFD Personnel that has been issued protective ensemble or ensemble elements will be notified by email of the date that ensemble or ensemble elements must be made available for pickup. All Assigned KFD Personnel must submit all ensemble and ensemble elements issued to them for advanced cleaning and inspection.

Annual advanced cleaning and inspection are conducted during off-duty hours. Therefore, Assigned Department Personnel who are on duty on their scheduled date or on any of the 3 days following their scheduled date must notify the Shift Lieutenant in advance and request rescheduling.

The Administrative Team or Shift Lieutenant will record upon sending element(s) to PPE Care into the Emergency Reporting system:



1. Date(s) sent
2. Reason for services and contractor used for services

PPE Care will be responsible for records pertaining to the services they provide. These includes:

1. Dates(s) and findings of advanced cleaning or decontamination
2. Date(s) of repair(s) and description of repair(s)

## **Section 37.06 Cleaning and Decontamination**

### **37.06.01 General Information**

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The purpose of cleaning is to remove substances that could affect the performance of ensembles or personal protective equipment and to remove substances that are potentially hazardous to the user.

### 37.06.02 Routine Cleaning

Routine cleaning is the responsibility of each Assigned Department Personnel who has been issued personal protective equipment. It is a light cleaning performed by the Assigned Department Personnel without the elements being taken out of service.



***Routine cleaning must be performed after each use and immediately after an emergency response to remove surface contaminants before they set in.***

Personal protective equipment should be cleaned as follows:

- Locate and read the manufacturer’s label for instructions on cleaning and drying
- Brush off dry debris
- Rinse off other debris with a garden hose
- High velocity water jets shall not be used
- Gently brush with a soft bristle brush when necessary and rinse again

If further cleaning is necessary, the following utility sink procedure should be used: Protective gloves and safety glasses must be worn Pre-treat heavily soiled areas or spots Do not use chlorine bleach Use warm water that does not exceed 40° C (105° F) Gently brush with a soft bristle brush Rinse thoroughly Air dry by hanging or placing in Ready Racks in Gear room Do not dry in the sun Inspect for cleanliness

If the above cleaning procedures have not rendered the element clean enough for service, the element must be taken out of service and subjected to an advanced cleaning.

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### 37.06.03 Advanced Cleaning

Advanced cleaning will be conducted at a minimum of once every 12 months, or whenever personal protective equipment is soiled to the extent that soil cannot be sufficiently removed by routine cleaning. Advanced cleaning is a thorough cleaning that requires personal protective equipment to be taken out of service.



Advanced cleaning procedures are based on each protective equipment element's manufacturer's care instructions. Therefore, they must be updated by the Shift Lieutenant whenever new personal protective equipment is purchased or issued.

The following guidelines should be used by Assigned KFD Personnel to determine if personal protective equipment is soiled to the extent that advanced cleaning is necessary:

- Obvious odor that cannot be removed with routine cleaning or indicates contamination (diesel fuel for example)
- Visible soil that cannot be sufficiently removed with routine cleaning
- Known exposure to hazardous chemicals
- Known exposure to biohazards
- At the time of advanced inspection, personal protective equipment has not been subjected to an advanced cleaning in the preceding 12 months

KFD has contracted with PPE Care for the provision of advanced cleaning and inspection. Annual advanced cleaning and inspection will be coordinated by the Administrative Team. Each Assigned KFD Personnel who has been issued personal protective equipment will be notified by email of the date that personal protective equipment must be made available for pickup.

All Assigned KFD Personnel must submit all personal protective equipment issued to them for advanced cleaning and inspection. Annual advanced cleaning and inspection is conducted during off-duty hours. Therefore, Assigned KFD Personnel who are on duty on their scheduled date or on any of the 3 days following their scheduled date must notify the Shift Lieutenant in advance and request rescheduling.

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Assigned KFD Personnel whose issued personal protective equipment is not scheduled for advanced cleaning and inspection, but meet criteria set out in the guidelines for advanced cleaning, must notify their Shift Lieutenant. The Shift Lieutenant must complete documentation in Emergency Reporting System and submit to the Administrative Team. Upon approval, the Shift Lieutenant will arrange for an advanced cleaning to be performed.

The Shift Lieutenant will record upon sending to PPE Care into the Emergency Reporting System:

1. Date(s) sent,
2. Reason for services and contractor used for services

PPE Care will be responsible for records pertaining to the services they provide.

These include:

1. Date(s) and findings of advanced cleaning or decontamination
2. Date(s) of repair(s) and description of repair(s)

#### **37.06.04 Drying Procedure**



Air Drying Procedure

- Place elements in an area with good ventilation.
- Do not dry in direct sunlight.

Machine Drying Procedure

- Do not overload the machine.
- Fasten all closures.
- Use no-heat or air-dry setting if available.
- If heat must be used, ensure that the basket temperature does not exceed 105°F.
- If heat is used, remove garments before they are completely dry

#### **37.06.05 Decontamination**

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Decontamination is a specialized cleaning of personal protective equipment that is known or suspected to be contaminated with hazardous materials. Personal protective equipment will be evaluated on the scene by the Shift Lieutenant to assess extent of contamination. The Shift Lieutenant will determine whether the elements need to be isolated, tagged and bagged on scene and sent to PPE Care for decontamination.

Personal Protective Equipment contaminated by CBRN terrorism agents must be immediately retired upon confirmed exposure.

### **Section 37.07 Repairs**

#### **37.07.01 General Information**



The purpose of repair is to correct damage to ensure that personal protective equipment performs at a serviceable level. Unrepaired damage can make them unsafe for use or eventually result in making them unsafe for use.

Although minor repairs to protective coats and pants and most repairs of helmets, gloves and footwear can be made by designated personnel of this fire department who have been trained to provide basic repairs, field repairs might not be as strong or permanent as professional repairs. The Administrative Team or Kemah Fire Department Safety Officer determines when repairs of any complexity, including those defined as basic repairs by NFPA 1851, 2014 Edition, exceed the repair proficiency of the fire department’s trained personnel.

All repairs must be done in a manner and using like materials and components that are compliant to NFPA 1971.

Basic repairs that may be accomplished by designated trained personnel include:

- Limited protective coat and pants repairs, performed in the same manner and with like construction of the manufacturer
- Patching of minor tears, char marks, ember burns and abraded areas in outer shells

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- Repairing skipped, broken or missing stitches to an outer shell; not to exceed 1” on seams that are part of the garment construction (A seams)
- Replacement hardware, except positive closure systems on outer shells
- Closing liner systems after complete liner inspection
- Helmet repair and component replacement, in accordance with manufacturer’s instructions Glove repair, in accordance with manufacturer’s instructions
- Footwear repairs, in accordance with manufacturer’s instructions

### 37.07.02 Repairs for All Ensemble Elements



Assigned Department Personnel who suspect that a problem exists should inform their Shift Lieutenant. The Shift Lieutenant should send an email to document suspicions and send to Administrative Team to request an advanced inspection.

Before any repair work is performed, elements that fall within the guidelines for determining whether personal protective equipment should be cleaned (*reference 37.06.02 Routine Cleaning*) must be subjected to an advanced clean.

Basic repairs as defined by NFPA 1851, may be performed by designated personnel who have been trained to perform basic repairs. The Administrative Team will determine when repairs of any complexity, including those defined as basic repairs, exceed the repair proficiency of the trained KFD Personnel.

Trained KFD Personnel responsible for maintenance will record into the Emergency Reporting System:

- Date(s) and findings of advanced inspections
- Dates(s) and findings of advanced cleaning or decontamination
- Reason for advanced cleaning or decontamination
- Date(s) of basic repair(s) and description of repair(s)
- Date(s) of advanced and moisture barrier repair(s), contractor that performed repair(s) and description of repair

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### 37.07.03 Repairs for Protective Coats and Pants

Advanced repairs of protective coats and pants, and repairs that exceed the proficiency of the fire department’s trained personnel, must only be performed by the original element manufacturer or a Verified Independent Service Provider (ISP).

KFD has contracted with Gear Cleaning Solutions, a Verified ISP, for the provision of protective coat and pants advanced repair. When it is determined through advanced inspection that a protective coat and/or pants requires advanced repair, the damaged element will remain out of service until repairs have been performed. The Contractor will notify the Administrative Team that the damaged element will remain out of service.

The Administrative Team will issue an email to inform the assigned department personnel and his Shift Lieutenant that the damaged element is out of service, and that the assigned department personnel must use backup gear (provided by the Shift Lieutenant) until the repaired element(s) is available for use



Upon return of any repaired ensemble or ensemble element, assigned department personnel must perform a routine inspection (*37.06.02 Routine Cleaning*). If damage has not been repaired or the repair has not been done to an acceptable level, the Administrative Team must be notified.

### 37.07 Storage

#### 37.07.01 General Information

Proper storage of personal protective equipment extends its life, maintains its performance and reduces potential health risks. Improper storage can result in damage to the ensemble or ensemble element and can compromise the assigned department personnel’s safety. Certain conditions can result in deterioration of performance of the ensemble or element or create potential health hazards.



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Ultraviolet (UV) light is a known cause of personal protective equipment degradation. Personal protective equipment must never be stored in direct sunlight. They should be stored to minimize exposure to all sources of UV light, including fluorescent light and other UV sources.

Storage of wet or moist personal protective equipment promotes the growth of mildew and bacteria, which can lead to skin irritation or more serious medical conditions and affect the strength of some materials.

Storage in extreme temperatures for prolonged periods of time will accelerate deterioration of ensemble and elements.

Soiled personal protective equipment can present a health risk to individuals who come across it. Therefore, they should not be stored in personal living quarters and passenger compartments of vehicles. Furthermore, to prevent the spread of disease and cross contamination, soiled personal protective equipment should be segregated from other items of equipment and laundry.



Storage or transporting in compartments or trunks with sharp objects, tools or other equipment could damage ensembles and ensemble elements.

Storage in contact with hydraulic fluids, solvents, hydrocarbons, hydrocarbon vapors or other contaminants can cause material degradation, transfer toxins to individuals and reduce FR properties of personal protective equipment.

### **37.07.02 On-Duty Storage**

While assigned department personnel are on-duty, personal protective equipment that is not being worn must not be placed in direct or indirect sunlight.

This fire station has a designated area for staging personal protective equipment for use. This area meets the conditions for proper storage. Therefore, it must be utilized by on-duty assigned department personnel when personal protective equipment is not being worn.

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*Personal protective equipment will not be transported in a trunk or vehicle with other equipment, to avoid damage.*

### **37.07.03 Off-Duty Storage**

While assigned department personnel are off-duty, personal protective equipment must not be stored in direct or indirect sunlight, the trunks or other compartments of personal vehicles or taken to a personal residence.

Before going off-duty, assigned department personnel should perform a routine cleaning (37.06.02 Routine Cleaning) if personal protective equipment has become soiled during on duty activity.

Assigned Department Personnel are given a designated area within the Fire Station that meets the conditions for proper storage for storing personal protective equipment while off-duty. Clean, dry ensembles and ensemble elements must be placed in the provided storage area before going off duty.



### **Section 37.08 Retirement**

#### **37.08.01 General Information**

KFD has specific criteria for the permanent removal of personal protective equipment from operational use. Personal Protective Equipment that is removed from service because it is no longer suitable for primary personal protection will be destroyed or marked and allocated to non-live fire training, dependent on reason for retirement.

#### **37.08.02 Criteria for Retirement**

1. Physical damage that cannot be repaired
2. Physical damage that cannot be economically repaired (see Appendix A: Turnout Gear Repair Limit Calculator)

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3. Physical damage arising from exposure to excessive heat beyond the conditions which personal protective equipment were designed to withstand
4. Contaminated to the extent that it cannot be safely decontaminated
5. Contaminated to the extent that it cannot be economically decontaminated (see page 33 Appendix A: Turnout Gear Repair Limit Calculator)
6. Significant change in department specification
7. Does not meet past or current NFPA standards Mandatory retirement due to age of personal protective equipment
8. Ten years from date of manufacture, except for proximity shells which are five years from the date of manufacture

### 37.08.03 Retirement and Disposition

The decision to retire Personal Protective Equipment is typically based on the evaluation result of advanced inspection. Advanced inspections will be conducted at a minimum of every 12 months or whenever routine inspections indicate that a problem exists. Advanced inspections may also be initiated after an incident where exposure to excessive heat, severe contamination or other extreme conditions could have compromised the personal protective equipment's protective performance.

Kemah Fire Department has contracted with PPE Care for the provision of advanced cleaning and inspection or advanced inspection. PPE Care makes retirement recommendations based on the department's retirement criteria. When, in their judgment, personal protective equipment meets the established retirement criteria, PPE Care will notify the Administrative Team. The Administrative Team will evaluate the contractor's recommendation and approve retirement when satisfied that criteria have been met.

Damaged or contaminated Personal Protective Equipment will be tagged with a Condemn Tag and sent back to the department for disposal. Personal Protective Equipment that has been retired for reasons other than damage or contamination, and remain in serviceable condition,

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will be tagged for training, permanently marked “for training use only” and sent back to the department to the attention of the Administrative Team.

PPE Care will be responsible for records pertaining to the services they provide. They include:

1. Date of retirement recommendation
2. Date sent back to the department

### **Section 37.09 Special Incident Procedure**

#### **37.09.01 General Information**



Kemah Fire Department has procedures for the handling and custody of personal protective equipment that was worn by assigned department personnel who were victims at incidents where serious injuries or fatalities to the assigned department personnel occurred. This procedure is limited to the actions related to elements of personal protective equipment only.

#### **37.09.02 Custody of Personal Protective Equipment**

Personal protective equipment used during the incident by the injured or deceased assigned department personnel will be immediately removed from service by Shift Lieutenant.

The Shift Lieutenant will tag removed personal protective equipment with Service Tag and place into cardboard boxes that are reserved for this use. Do not place elements into plastic bags before storing. Boxes must be labeled with date of incident, description of incident, affected assigned department personnel’s name and employee number and contents.

Confiscated personal protective equipment will be held in the DPS Evidence Room. Access to confiscated personal protective equipment will be controlled with Incident Service Number, which requires approval of the evidence sergeant.

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Confiscated personal protective equipment will be formally evaluated by an Independent Evaluator. Dependent on the evaluation results or severity of the incident, the medical examiner, law enforcement, element manufacturers or other experts may be consulted.

Confiscated personal protective equipment will be retained not less than 1 year for fire department evaluation. Personal protective equipment requiring further evaluation will be retained up to 10 years.

**Section 37.10 Appendix A: Turnout Gear Repair Limit Calculator**

**Turnout Coat Cost \$800.00**

Age of Coat	% of Original Repair	Amount Allowed
1st Year	70%	\$560.00
2nd Year	50%	\$400.00
3rd Year	40%	\$320.00
4th Year	25%	\$200.00
5th Year	20%	\$160.00
6th Year	15%	\$120.00
7th Year	10%	\$80.00
8th Year	5%	\$84.00
9th Year	5%	\$40.00
10th Year	0%	\$0.00

**Turnout Pant Cost \$600.00**



Age of Coat	% of Original Repair	Amount Allowed
1st Year	70%	\$420.00
2nd Year	50%	\$300.00
3rd Year	40%	\$240.00
4th Year	25%	\$150.00
5th Year	20%	\$120.00
6th Year	15%	\$90.00
7th Year	10%	\$60.00
8th Year	5%	\$30.00
9th Year	5%	\$30.00
10th Year	0%	\$0.00

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### Section 37.11 Appendix B: Turnout Wear Test Evaluation

*Reference Document: NFPA 1851 / Selection / Annex A.5.1*

Prior to starting the selection process of structural firefighting ensembles and ensemble elements, a risk assessment should be performed.

A risk assessment should consider and include, but not be limited to:

- type of duties performed
- frequency of ensemble element use
- organization’s experiences
- incident operations
- geographic location and climate.

Based on this risk assessment, KFD shall compile and evaluate information on the comparative strengths and weaknesses of the elements under consideration and that they interface properly with other personal protective items being used. When a field evaluation is being conducted, KFD shall establish criteria to ensure a systematic method of comparing products in a manner related to their intended use. Assess their performance relative to KFD expectations.



The committee should consist of:

1. Kemah Fire Department Safety Officer
2. Appointed Assigned KFD Personnel by the Fire Chief/Fire Marshal
  - ✓ that has diverse background from both labor and management who have several years of experience in firefighting activities.

The purpose of the evaluation is to improve the organization’s criteria over existing specifications.

To accomplish this, five areas are identified as quantifiable parameters.

1. Technical Performance
2. Preparation



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3. Fit and Function
4. Performance
5. In Service

### 37.11.01 INSTRUCTIONS

There are four forms attached.

1. Technical Performance Form-completed once at the beginning of the evaluation by the committee. This information should be obtained from the element manufacturer and should be verified (example: product literature, certification documentation, etc.). All data should be considered relative and the committee should educate themselves on acceptable ranges of performance. The committee and each wear test participant should receive a product presentation from each manufacturer or manufacturer's representative.
2. Preparation Form-completed once at the beginning of the evaluation by the individual wear test participant. This covers proper fit, familiarity of construction features and any special preparation such as washing of the garment prior to use.
3. Performance Form-completed once during scheduled wear trial evaluation on training ground.
4. In Service Form-completed repetitively through duration of shift evaluation, a period recommended to be several months extending through at least two seasons. This form should be completed at each rotation of brand or manufacturer. At the end of the evaluation, the scores and subjective comments should be tabulated. An Excel spreadsheet can be utilized to accomplish this.

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### 37.11.02 TECHNICAL PERFORMANCE FORM

#### TECHNICAL PERFORMANCE FORM

Reference Document: NFPA 1971, 2007 Edition.

Manufacturer: \_\_\_\_\_ Model: \_\_\_\_\_

Date: \_\_\_\_\_

#### Composite Performance

(Outer Shell/Moisture Barrier/Thermal Liner). Consideration should be given to the optimal balance of TPP and THL based on the risk assessment. Spot thermal insulation should be used to enhance areas identified as potential burn hazards. If higher values are desired above the NFPA minimums, the minimum values below should be increased.

- 7.1.1 Thermal Protective Performance (TPP) Minimum 35 \_\_\_\_\_
- 7.2.2 Total Heat Loss (THL) Minimum 205 \_\_\_\_\_
- 7.1.6 Conductive Compressive Heat Resistance (CCHR) Minimum 25 (knees and shoulders) \_\_\_\_\_

Note – Some test methods do not take into account moisture in the system. Therefore, consideration should be given to actual field performance when water, sweat, garment weight and heat conductivity become factors.

#### Outer Shell Performance

Consideration should be given to the need for strength, durability and color fastness.



- 7.1.12 Trapezoidal Tear Resistance Minimum 22 \_\_\_\_\_
- 7.1.18 Water Absorption Resistance Minimum 30% \_\_\_\_\_

Notes-Taber abrasion is not a required NFPA performance test, shows no correlation to durability or actual wear life and has been shown to provide inconsistent results. Color fastness is affected by the method of dyeing. The committee should become knowledgeable about the various methods of fabric dyeing.

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Moisture Barrier Performance

Considerations should be the desired breathability (based on composite performance – see above) and durability.

Thermal Liner Performance

Considerations should be based on desired thermal insulation (based on composite performance – see above), working weight, comfort and moisture management needs.



Thermal Liner Face Cloth

Consideration should be given to the lubricity of the thermal liner face cloth. The higher the lubricity of the face cloth, the less friction against the skin or station work uniform, which aids in comfort and donning.

Water Absorption

Minimizing the amount of water absorption in the system reduces the risk of burn injury. If possible, the following assessments should be made. This portion should be completed by the safety committee. See methodology to be used in the Preparation document immediately following.

Turnout Pants Water Wicking Weight Gain	Dry Weight	_____	Wet Weight	_____
Turnout Coat Water Absorption Weight Gain	Dry Weight	_____	Wet Weight	_____
Turnout Coat Water Weight at Two Hours	Two-Hour Weight	_____		

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### 37.11.03 PREPARATION FORM

#### PREPARATION FORM

The participant should familiarize themselves with the manufacturer’s User Instructions, the garment closure system, DRD, and product features (such as pockets, accessories, and any other unique components such as safety harnesses or belts).

#### Fit and Function:



Sizing and Interface – The following should be evaluated prior to wearing the garments in order to ensure proper fit. If you check no to any of the following, the garment should be properly adjusted prior to use.

Fit and function	Yes	No
Are the sleeves the appropriate length for the gloves worn?	<input type="checkbox"/>	<input type="checkbox"/>
Are the pants the appropriate length for the boots worn?	<input type="checkbox"/>	<input type="checkbox"/>
Is there a minimum of 2” overlap of the coat and pants when reaching?	<input type="checkbox"/>	<input type="checkbox"/>
Is the pants waist the appropriate size?	<input type="checkbox"/>	<input type="checkbox"/>
Is the coat chest diameter the appropriate size?	<input type="checkbox"/>	<input type="checkbox"/>
Is the DRD the correct size and secured correctly?	<input type="checkbox"/>	<input type="checkbox"/>

#### Washing:

All turnout samples should be washed once prior to wearing according to NFPA 1851. Subsequent washings should take place during the in-service period and an assessment of durability completed at the end of the evaluation. Fabric tears should be noted as to cause, since any fabric or reflective trim can tear when exposed to sharp objects.

Note- Contact the distributor if any normal fabric tears or ensemble defects arise during the evaluation period. This provides you with an opportunity for a service evaluation based on response to the rapidity of the repair and the return of the ensemble.

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Wicking and Weight Gain and Drying:

Water wicking upward in the turnout gear can result in fire fighter steam burns, knee compression burns and undesirable weight gain. The following evaluation will be done following the washing and 24-hour drying. The information obtained in this evaluation should be included on the preceding Technical Performance Form.

a) Immerse the lower legs (starting at the pants cuff) of the turnout pants in four inches (4") of water for 15 minutes. Weigh the turnout pants (a simple fish type scale is sufficient) before and after the immersion and the resulting weight gain will be recorded on the Technical Performance Form.

b) The turnout coat, outer shell and thermal liner will be completely submerged in water for 15 minutes. Weigh the turnout coat (a simple fish type scale is sufficient) before and after the immersion and the resulting weight gain will be recorded on the Technical Performance Form.

c) Immediately following (b), hang the turnout coat on a hook. After a period of two hours, weigh the turnout coat for a second time using the same scale. The weight will be recorded on the Technical Performance Form.

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### 37.11.04 PERFORMANCE FORM

#### PERFORMANCE FORM

**Manufacturer** \_\_\_\_\_ **Model** \_\_\_\_\_  
**Serial Number** \_\_\_\_\_ **Participant Name** \_\_\_\_\_

The evaluator should be properly hydrated. The recommendation is for each evaluator to consume 8 oz. of water prior to the start of each exercise. The exercises should be completed at a moderate pace with the evaluator focusing on the garment performance.

The evaluators and manufacturer brands should be mixed in consideration of the ambient temperature increase from morning to afternoon, with the intent of minimizing the impact on the evaluation.

The committee should note below the environment and consider this when analyzing scores (information should include ambient conditions: temperature, humidity, etc.; burn facility conditions: temperature, etc.).

Ladder Raise: As a member of a team, retrieve a 24' ladder from the engine. Raise, secure and climb the ladder to the height of the fly section to lock in (circle one).



Rate the flexibility of the knees	Flexible	5	4	3	2	1	Restrictive
Rate the flexibility of the crotch and thighs	Flexible	5	4	3	2	1	Restrictive
Rate the flexibility of the shoulders	Flexible	5	4	3	2	1	Restrictive
Rate the flexibility of the arms and elbows	Flexible	5	4	3	2	1	Restrictive
Rate the overall cut of the pants	Conforming	5	4	3	2	1	Bulky
Rate the overall cut of the coat	Conforming	5	4	3	2	1	Bulky
Rate the overall comfort of the pants	Comfortable	5	4	3	2	1	Uncomfortable
Rate the overall comfort of the coat	Comfortable	5	4	3	2	1	Uncomfortable

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Advancing a Pre-connect: Advance a 1 3/4" pre-connect, charge the line and flow water to knock over three traffic cones placed at positions of 9, 12 and 3 o'clock, maneuvering the line each time so it is aligned with the cones (circle one).

Rate the flexibility of the pants	Flexible	5	4	3	2	1	Restrictive
Rate the flexibility of the coat	Flexible	5	4	3	2	1	Restrictive
Rate the overall comfort of the pants	Comfortable	5	4	3	2	1	Uncomfortable
Rate the overall comfort of the coat	Comfortable	5	4	3	2	1	Uncomfortable

SCBA Confidence Course: Complete the fire department's authorized course (circle one).

Rate the flexibility of the knee when crawling	Flexible	5	4	3	2	1	Restrictive
Rate the padding in the knee for the thickness	Sufficient	5	4	3	2	1	Insufficient
Rate the padding in the knee for bulkiness	Not Bulky	5	4	3	2	1	Bulky
Rate the flexibility of the shoulders	Flexible	5	4	3	2	1	Restrictive
Rate the flexibility of the arms and elbows	Flexible	5	4	3	2	1	Restrictive
Rate the collar effectiveness and comfort	Comfortable	5	4	3	2	1	Uncomfortable

Live Fire-Complete the fire department's authorized live fire exercise, such as "Burn to Learn" or other. Minimum should be entry with a charged 1 3/4" handline, advance to seat of fire and drag a dummy out of the burn building.



Note-The burn exercise should be completed twice using the same turnouts with a sufficient rehab break for hydration. The evaluator should note that on the first entry the turnouts will be at ambient temperature and relatively dry. Then note on the second entry how much "stored energy" and sweat/weight gain has occurred and the effect on task fulfillment.

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First entry – rate the overall function of the pants	Flexible	5	4	3	2	1	Restrictive
First entry – rate the overall function of the coat	Flexible	5	4	3	2	1	Restrictive
Second entry – rate the protective effectiveness	Flexible	5	4	3	2	1	Restrictive
Second entry – rate the water/weight gain	Comfortable	5	4	3	2	1	Uncomfortable
Second entry – rate the overall comfort of the pants	Comfortable	5	4	3	2	1	Uncomfortable
Second entry – rate the overall comfort of the coat	Comfortable	5	4	3	2	1	Uncomfortable

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### 37.11.04 IN-SERVICE FORM

#### IN SERVICE FORM

This form needs to be completed after each shift the garment was used and for each manufacturer's brand.

Manufacturer \_\_\_\_\_ Model \_\_\_\_\_  
 Serial Number \_\_\_\_\_ Participant Name \_\_\_\_\_  
 Date \_\_\_\_\_  
 Was this gear used at a structure fire this shift? Yes \_\_\_\_\_ No \_\_\_\_\_

Please rate the turnout gear on the following (circle one).



Flexible	5	4	3	2	1	Stiff
Ease of donning	5	4	3	2	1	Difficulty donning
Ease of doffing	5	4	3	2	1	Difficulty doffing
Comfort with SCBA	5	4	3	2	1	Discomfort with SCBA
Good SCBA interface with pockets	5	4	3	2	1	Poor SCBA interface with pockets
Good shoulder flexibility with SCBA	5	4	3	2	1	Poor shoulder flexibility with SCBA
Good coat/collar closure	5	4	3	2	1	Difficult coat/collar closure
Sufficient padding on shoulders	5	4	3	2	1	Insufficient padding on shoulders
Flexibility of arms and elbows	5	4	3	2	1	Inflexibility of arms and elbows
Like pants closure/belt	5	4	3	2	1	Dislike pant closure/belt
Sufficient padding in knees	5	4	3	2	1	Insufficient padding in knees
Flexible when kneeling	5	4	3	2	1	Inflexible when kneeling
Coat is cool to work in	5	4	3	2	1	Coat is too hot to work in

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Pants are cool to work in	5	4	3	2	1	Pants are too hot to work in
Turnouts are light	5	4	3	2	1	Turnouts are heavy
Pockets are adequate	5	4	3	2	1	Pockets are inadequate
Suspenders are comfortable	5	4	3	2	1	Suspenders are uncomfortable
I like the design/looks	5	4	3	2	1	I dislike the design/looks
Satisfactory fit	5	4	3	2	1	Unsatisfactory fit
Comfortable turnouts!	5	4	3	2	1	Uncomfortable turnouts!

I rate the use of these turnouts this shift as (circle one):  
 Exceptional / Acceptable / Marginal/Unacceptable

Please write a statement about the overall fit and function of the gear and elaborate on any very positive or very negative scores you gave above.

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### Section 37.12 Appendix C: Helmet Wear Test Evaluation

Thank you for participating in the helmet wear test program. Your feedback is instrumental for the continuous improvement in the quality of our helmets

**Model:** \_\_\_\_\_ **Helmet Manufacture Date:** \_\_\_\_\_ (Located on barcode under brim)

**Fire Department:** \_\_\_\_\_

Your name: \_\_\_\_\_ Rank: \_\_\_\_\_ Phone #: \_\_\_\_\_

Station #: \_\_\_\_\_ Address: \_\_\_\_\_ Shift: \_\_\_\_\_

Dates Tested: From: \_\_\_\_\_ To: \_\_\_\_\_

Approximate # of Runs: \_\_\_\_\_ # of Working Fire Calls: \_\_\_\_\_

1. What type of firefighting/rescue do you handle? (check all that apply)



- Structural    
 Proximity    
 HAZMAT    
 Other

2. Please check all helmet brands participating in the wear test:

- |   |   |
|---|---|
| <input type="checkbox"/> Bullard modern style composite         | <input type="checkbox"/> Paul Conway American Heritage (leather traditional)  |
| <input type="checkbox"/> Bullard modern style thermoplastic     | <input type="checkbox"/> Paul Conway American Classic (composite traditional) |
| <input type="checkbox"/> Bullard traditional style              | <input type="checkbox"/> Paul Conway Legacy 5 (modern composite shell)        |
| <input type="checkbox"/> Cairns leather                         | <input type="checkbox"/> Paul Conway Liberator (rescue)                       |
| <input type="checkbox"/> Cairns fiberglass traditional          | <input type="checkbox"/> Paul Conway aluminized traditional                   |
| <input type="checkbox"/> Cairns thermoplastic traditional       | <input type="checkbox"/> Paul Conway aluminized modern                        |
| <input type="checkbox"/> Cairns fiberglass modern               | <input type="checkbox"/> Paul Conway aluminized J-Fire configuration          |
| <input type="checkbox"/> Cairns thermoplastic modern            | (circle one - traditional, modern)  |
| <input type="checkbox"/> Morning Pride Ben Franklin traditional | <input type="checkbox"/> Other (list): _____                                  |
| <input type="checkbox"/> Morning Pride Liter Force modern       | _____   |

3. In what circumstances have you tested the helmet? (check all that apply)

- Actual daily operations (structural, proximity, HAZMAT, etc.)  
 Other (list): \_\_\_\_\_  
 Training

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**PLEASE RATE THE HELMETS ON THE FOLLOWING FEATURES:**

**Check one**

4. Please rate the features of this helmet from 1 to 4 (1 being poor, 4 being excellent) for each category as compared to your current helmet:

- |                                       | Poor                       |                            |                            | Excellent                  |
|---------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| A. Protection                         | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| B. Weight                             | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| C. Durability                         | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| D. Comfort                            | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| E. Fit/Function                       | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| F. Appearance                         | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| G. Balance/Stability                  | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| H. Head and Neck Fatigue or Headaches | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |

5. Please rate the features of this helmet from 1 to 4 (1 being poor, 4 being excellent) for each category as compared to other wear test helmet(s):

- |               | Poor                       |                            |                            | Excellent                  |
|---------------|----------------------------|----------------------------|----------------------------|----------------------------|
| A. Protection | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| B. Weight     | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| C. Durability | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> |

