CITY OF DELRAY BEACH
100 N.W. 1st AVENUE, DELRAY BEACH, FL 33444

Solicitation Addendum

Addendum No.:	1
Solicitation No.:	2017-007
Project No.:	N/A
Solicitation Title:	Firefighter Protective Equipment; Bunker Gear
Addendum Date:	October 14, 2016
Purchasing Contact:	Dukagjin Basha, Purchasing Agent

THE FOLLOWING ITEMS ARE MADE AND HEREBY BECOME A PART OF THIS SOLICITATION:

Change to:

INSTRUCTIONS TO BIDDERS, ITEM 15, SOLICITATION SCHEDULE

The Solicitation schedule has been changed as shown below:

ACTIVITY	DATE
Issue ITB	September 30, 2016
Deadline for Delivery of Questions	October ~~10~~ 17, 2016
Due Date and Time (for delivery of Bids)	October ~~21~~ 31, 2016; 2:00 P.M., ET
Institute Cone of Silence	October ~~21~~ 31, 2016; 2:00 P.M., ET
Evaluation Complete (Responsive and Responsible)	~~October~~ ~~26~~ November 4, 2016
Bid Tabulation Complete	~~October 27~~ November 7, 2016

NOTE: Items that are ~~struck through~~ are deleted. Items that are underlined have been added. All other terms and conditions remain as stated in the RFP.

Add:

FORM 7 – SPECIFICATION COMPLIANCE

Form 7, Specification Compliance, has been added. Bidders must complete and return Form 7 with their Bid.

Replace:

SECTION 3: SPECIFICATIONS

Replace Section 3, Specifications, with the attached Section 3, Specifications, revised per this Addendum No. 1.

QUESTIONS AND RESPONSES:

Q1. What is the closure system for the Bunker Coat?
R1. See the specifications revised per this Addendum 1.

Q2. Is there a Radio Pocket? spec. (Size, Location)?
R2. See the specifications revised per this Addendum 1.

Q3. Is the Department Patch Silk screen or a patch the department provides for the manufacturer to sew on?
R3. See the specifications revised per this Addendum 1.

Q4. What is the pant closure system? Zipper and what else for the second positive closure?
R4. See the specifications revised per this Addendum 1.

Q5. What is the pocket size for the pocket on the lower leg?
R5. See the specifications revised per this Addendum 1.

Q6. Is there a sample to see for the Arashield tool compartment?
R6. See the specifications revised per this Addendum 1.

End of Addendum

INSTRUCTIONS:
Receipt of this addendum must be acknowledged as instructed in the solicitation document. Failure to acknowledge receipt of this Addendum may result in the disqualification of Bidder's response.

Form – 7 Specification Compliance

I _____(name) as a duly authorized representative of _____ (Bidder) do hereby attest that all items detailed in the scope will be provided and all items submitted as part of this bid complies with the Specifications except as detailed below.

Exceptions from the Specifications:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Indicate below whether the manufacturer of the bunker gear proposed is ISO Standard 9001 certified and registered by checking either "Yes" or "No" in the space provided.

☐ Yes, the manufacturer of the gear proposed is ISO Standard 9001 certified and registered.

☐ No, the manufacturer of the gear proposed is not ISO Standard 9001 certified and registered.

Bidder: _____

Signature: _____

Printed Name: _____

Date: _____

Title: _____

SECTION 3: SPECIFICATIONS

1. **PURPOSE**: The City is seeking bids from qualified firms for Bunker Gear per the specifications and requirements of this ITB.

2. **SPECIFICATIONS:**
   Bunker Gear must meet all the requirements set forth in NFPA 1851: Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, and NFPA 1971: Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting (2014 edition).

   a. **Color:**
      Black

   b. **Coat:**
      Kombat Flex PBI Outer Shell
      Caldura SL2i Thermal Liner
      Built in DRD (Drag Rescue Device)
      Crosstech Black Barrier
      Hi Vis Scotchite TripleTrim
      DELRAY BEACH upper back
      Gray Nomex Hand & Wrist Guard
      Mic Clip above pocket, slanted
      Mic Clip opposite chest, slanted
      Snap and Strap
      Black Arashield Cuffs
      Black Arashield Elbows w/padding
      Self Material Shoulders
      "343" Department Patch
      Hanging Letter Patch
      letters for last name
      Semi Expansion Pockets – STD

   c. **Pants:**
      Kombat Flex PBI Outer Shell
      Caldura SL2i Thermal Liner
      Crosstech Black Barrier
      3" Scotchite Triple Cuff Trim
      Zipper Fly
      Pocket Divider
      Kevlar Twill Full Pouch
      Arashield Pocket Outside
      Arashield Knees
      Silizone Knees
      Pocket Lower Leg
      Arashield Tool Compartment
      10x10x2 Pockets - Standard
      Suspenders – Standard

d. **Gear Bag:**
Black
Name tag holder
With shoulder strap
No logo or customization

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SCOPE OF SERVICES AND DETAILED SPECIFICATIONS

NOTE: Bidder must provide a sample of the turn-out gear jacket and trouser proposed with its Bid for evaluation. Samples will be returned at Bidder's expense upon award of an agreement. Bidder will be required to contact the City Purchasing Department to make arrangements for return shipment or pick-up of the samples.

SCOPE: Successful Bidder shall provide the following services:

1. **HOOK AND LOOP SUPPORT PROGRAM**
   Support program shall cover hook or loop tape that has begun to fray or otherwise degrade from normal wear. This program shall remain in effect for a period of five years from the original date of manufacture of the garment. This support program shall cover the repair or replacement, without charge, of any hook and/or loop on the garments produced by the manufacturer providing the garments are otherwise serviceable.

   This support program does NOT cover damage from fire, heat, chemicals, misuse, accident or negligence. Failure to properly care for garments will serve to void this support program.

2. **SIZING**
   Both male and female sizing samples shall be available at successful Bidders local office for firefighters to try on for sizing purposes. Within 96 hours of notice by the City, successful Bidder shall have staff training in sizing and fitting turn-out gear available during business hours of 8:00 a.m. through 5:00 p.m. to assist firefighters with selecting the correct size and to ensure proper fit. Though measuring with a tape measure may be used as part of the sizing process, measuring alone without the opportunity to try on samples is not acceptable.

3. **GARMENT TRAINING AND SUPPORT**
   On-site care and maintenance training shall be provided by the manufacturer. Training shall be in compliance with NFPA 1851, current edition, at the conclusion of which each participant shall receive a certificate of completion.

4. **BAR-CODE/RECORD KEEPING INTERFACE**
   A one-dimensional barcode, in the interleaved 2 of 5 format shall be printed on the label of each separable layer of the garment.
   This barcode shall represent the serial number of the garment. The manufacturer shall be able to provide a detailed list of each asset of a drop-shipped order, and shall include the following:
   - Brand
   - Order Number
   - Serial Number
   - Style Number
   - Color
   - Description
   - Chest/Waist Size
   - Jacket/pant Length
   - Sleeve Length
   - Date of Manufacture
   - Mark-For Data

This information shall be able to be imported into the manufacturers web-based system designed to facilitate the organization and tracking of assets in accordance with the cleaning and inspection requirements of OSHA and NFPA 1851.

5. **PPE RECORD KEEPING**
   The manufacturer shall make available at no additional charge to the City, a secure, password protected data base website that is not brand specific for on-line ordering purposes. The website shall have the functionality to allow the manufacturer to import all of the pertinent data into the department's account so that initial account set-up data entry by fire department personnel is eliminated.

   The website should allow for the use a barcode scanner to scan the Interleaved 2 of 5 barcode found in the gear. Barcode programming should allow staff to search by serial number in the record keeping program.

6. **DELIVERY**
   Delivery shall not exceed 45-50 days after receipt of order. Successful Bidder shall provide loaner gear for warranty claims at no charge, and loaner/rental gear, upon request by the City, for emergency situations.

7. **THIRD PARTY TESTING AND LISTING PROGRAM**
   All components used in the construction of the garments in these Specifications shall be tested for compliance to NFPA Standard #1971 by Underwriters Laboratories (UL). Underwriters Laboratories shall certify and list compliance to that standard. Such certification shall be denoted by the Underwriters Laboratories certification label.

[Remainder of page intentionally left blank]

DETAILED SPECIFICATIONS
Firefighter Protective Equipment; Bunker Gear

NOTE: Any exceptions to the above Scope and the following Specifications must be clearly stated on Form 7-Specification Compliance. Use additional pages for exceptions, if necessary.

These specifications detail design and materials criteria to afford protection to the upper and lower body, excluding head, hands, and feet, against adverse environmental effects during structural fire-fighting. All materials and construction shall meet or exceed NFPA Standard #1971 and OSHA for structural fire fighters protective clothing.

1. **LABELS**

Appropriate warning label(s) shall be permanently affixed to each garment. Additionally, the label(s) shall include the following information.

- Compliance to NFPA Standard #1971
- Underwriters Laboratories classified mark
- Manufacturer's name
- Manufacturer's address
- Manufacturer's garment identification number
- Date of manufacture
- Size

2. **ISO CERTIFICATION / REGISTRATION**

The protective clothing manufacturer shall be certified and registered to ISO Standard 9001 to assure a satisfactory level of quality. Indicate below whether the manufacturer is so certified and registered by checking either "Yes" or "No" in the space provided on Form 7.

3. **WARRANTY**

The manufacturer shall warrant these jackets and pants to be free from defects in Materials and workmanship for their serviceable life when properly used and cared for.

4. **SIZING**

In order to insure that every member of the department can safely perform to the maximum of their ability without extra bulk and without restriction, Jackets and Pants shall be available in all sizes and dimensions as follows:

A. **Pants** (see note below)

Gender:	Specific Men's and Women's patterns must be available
Waist:	Even sizes
Patterns Available:	Men's: Relaxed and Regular
	Women's: Relaxed
Inseam:	Even sizes

NOTE: Pants available in only one standard shape will not be acceptable.

B. **Jackets** (see note below)

Gender	Specific Men's and Women's patterns must be available
Chest:	Even sizes
Back Length:	Men's 29", 32", 35", 40"
	Women's 26", 29"

Body Shape: Men's: Straight and Tapered
Women's: Straight
Sleeve: 1" increments
NOTE: Jackets available in only one standard shape will not be acceptable.

5. **OUTER SHELL MATERIAL - JACKETS AND PANTS**
The **Black Kombat Flex™** outer shell shall be constructed of 64/36 Kevlar®/PBI™ twill weave outer shell fabric with an approximate weight of 6.9 oz. per square yard. The Kombat Flex ™ material shall be manufactured by TENCATE and must be treated with **SST™ (SUPER SHELLTITE)** which is a durable water- repellent finish that also enhances abrasion resistance. Color of the garments shall be black.

6. **THERMAL INSULATING LINER - JACKET AND PANTS**
The thermal liner shall be constructed of 7.6 oz. per square yard TENCATE **"CALDURA® SL2i";** one layer of 1.5 oz. and one layer of 2.3 oz. per square yard Nomex® E-89™ spunlaced Nomex®/Kev lar® aramid blend, quilt stitched to a Kevlar® filament and fire retardant (FR) rayon/para-aramid/nylon inherently wicking Caldura® face cloth. A 7 inch by 9 inch pocket, constructed of self material and lined with moisture barrier material, shall be affixed to the inside of the jacket thermal liner on the left side by means of a single needle stitch. The thermal liner shall be attached to the moisture barrier and bound together by bias-cut neoprene coated cotton/polyester around the perimeter. This provides superior abrasion resistance to the less expensive, less durable, "stitch and turn" method. See Item 8 below for more information on this specification.

7. **MOISTURE BARRIER - JACKETS AND PANTS**
The moisture barrier material shall be W.L. GORE **CROSSTECH® black moisture barrier** - Type 2F, which is comprised of a CROSSTECH® membrane laminated to a 3.3 ounce per square yard Nomex® IIIA woven pajama check substrate . The CROSSTECH® membrane is an enhanced bicomponent membrane comprised of an expanded PTFE (polytetrafluoroethylene , for example Teflon®) matrix having a continuous hydrophilic (i.e. water-loving) and oleophobic (i.e. oil-hating) coating that is impregnated into the matrix. CROSSTECH® moisture barrier seams shall be sealed with GORE-SEAM® tape using a Series 6000 (or higher) GORE-SEAM™ sealing machine to afford comparable bacteriophage penetration resistance performance. Further mention of "Specified Moisture Barrier" in this specification shall refer to this section.

8. **SEALED MOISTURE BARRIER SEAMS**

All moisture barrier seams shall be sealed with a minimum 1 inch wide sealing tape. One side of the tape shall be coated with a heat activated glue adhesive. The adhesive side of the tape shall be oriented toward the moisture barrier seam. The adhesive shall be activated by heat and the sealing tape shall be applied to the moisture barrier seams by means of pressure exerted by rollers for that purpose.

9. **METHOD OF THERMAL LINER/MOISTURE BARRIER ATTACHMENT FOR JACKETS AND PANTS**

The thermal liner and moisture barrier shall be completely removable from the jacket shell. A total of six snap fasteners shall secure the thermal liner/moisture barrier to the outer shell along the length of the neck line under the top most collar. The top most collar shall be

turned under and finished such that the snaps on the collar will not be able to contact the wearers skin. Corresponding snaps shall be installed through a moisture barrier leader measuring an approximate height of 1.75 - 2 inches and shall not penetrate through to the outer shell on the backside of the collar. The remainder of the thermal liner/mois ture barrier shall be secured with snap fasteners appropriately spaced on each jacket facing and Ara-Shield® snap fasteners at each sleeve end. One of the Ara-shield® snap tabs shall be a different color in the liner to correspond with color coded snap tabs for ease of matching the liner system to the outer shell after inspection or cleaning is completed.

The thermal liner and moisture barrier shall be completely removable from the pant shell. Nine snap fasteners shall be spaced along the waistband to secure the thermal liner to the shell. The legs of the thermal liner/moisture barrier shall be secured to the shell by means of Ara-Shield® snap fasteners, 2 per leg. The Ara-shield® snap tabs on the shell shall be color coded to corresponding snap tabs in the liner for ease of matching the liner system to the outer shell after inspection or cleaning is completed. There shall be no hook and loop used to close the liner access opening.

10. **THERMAL PROTECTIVE PERFORMANCE**
The assembled garment, consisting of an outer shell, moisture barrier and thermal liner, shall exhibit a TPP (Thermal Protective Performance) rating of not less than 35.

11. **STITCHING**
The outer shell shall be assembled using stitch type #301, #401, #514 and #516. The thermal liners and moisture barriers shall be assembled using stitch type #301, #401, #504, #514, and #516. Stitching in all seams shall be continuous. Major A outer shell structural seams and major B structural liner seams, shall have a minimum of 8 to 10 stitches per inch. All major A seams shall be sewn with ball point needles only. All seams shall be continuously stitched.

12. **JACKET CONSTRUCTION**

A. **BODY**

The body of the shell and liner system shall be constructed of three separate panels consisting of two front panels and one back panel. The body panels shall be shaped so as to provide a tailored fit thereby enhancing body movement and shall be joined together by double stitching with Nomex® thread. One-piece outer shells shall not be acceptable.

B. **BACK**

The jacket outer shell shall include inverted pleats to afford enhanced mobility and freedom of movement in addition to that provided by the sleeves. The outer shell shall have two inverted pleats (one each side) installed on either side of the back body panel. The inverted pleats shall begin at the top of each shoulder and extend vertically down the sides of the jacket to the hem. Maximum expansion of the pleats shall occur at the shoulder area and taper toward the hem. Pleats that do not extend to the hem will not be considered, since they do not provide a true back.

The moisture barrier and thermal liner layers shall be designed with darts corresponding to the added length in the shell provided by the back pleats. The darts are positioned at the shoulder blades, outside of the SCBA straps and work together with the corresponding outer shell pleats in the back, providing maximum expansion. The moisture barrier darts will be seam sealed to assure liquid resistance integrity.

C. **LOGOS**

The garment brand shall be identified by means of red FR Nomex® thread embroidery on the top of the right collar denoting the manufacturer. There shall be a reflective label specific to the garment style, measuring 1inch wide by 4 inches long, installed on the left pocket flap.

D. **DRAG RESCUE DEVICE**

A Firefighter Drag Rescue Device (DRD) shall be installed in each jacket. The ends of a 1*Yi* inch wide strap, constructed of black Kevlar® with a red Nomex® center stripe, will be sewn together to form a continuous loop. The strap will be installed in the jacket between the liner system and outer shell such that when properly installed will loop around each arm. The strap will be accessed through a portal between the shoulders on the upper back where it is secured in place by an FR strap. The DRD shall be removable for laundering. The access port will be covered by an outside flap of shell material, with beveled corners designed to fit between the shoulder straps of an SCBA. The flap will have a NFPA-compliant 3M Scotchlite™ reflective logo patch sewn to the outside to clearly identify the feature as the DRD. The DRD shall not extend beyond the outside flap. This device provides a quickly deployed means of rescuing a downed firefighter. NOTE: Lightweight, rope-style DRD straps that will not support the weight of a firefighter will not be considered.

E. **LINER ACCESS OPENING (JACKET)**

The liner system of the jacket shall incorporate an opening at each of the leading edges of the left and right front panels. This opening shall run a minimum of 12 inches along the perimeters for the purpose of inspecting the integrity of the jacket liner system. When installed into the outer shell the Liner Access Opening will be covered and protected by the overlap of the outer shell facing.

F. **RETRO-REFLECTIVE FLUORESCENT TRIM**

The retro-reflective fluorescent trim shall be lime/yellow Reflexite® Brilliance® with stripe. Each jacket shall have an adequate amount of retro-reflective fluorescent trim affixed to the outside of the outer shell to meet the requirements of NFPA 1971 and OSHA

The trim shall be High Visibility (HV) style, three inch wide strips, in the following locations:

Around the bottom of the jacket within approximately one inch of the hem, horizontally across the chest area approximately three inches below the armpit, around each sleeve below the elbow, around each sleeve above the elbow, across the shoulders on the back approximately seven inches below the neck seam, two vertical stripes on the back (one on each side) beginning at the top of the bottom band of trim and extending up to the bottom of the upper band of trim.

G. **REINFORCED TRIM STITCHING**

All reflective trim is secured to the outer shell with Nomex® thread, using a locking chain stitch protected by our Kevlar cording. This strip of 3/32-inch strong, durable, flame resistant black Kevlar® cording provides a bed for the stitching along each edge of the retro-reflective fluorescent trim surface and affords extra protection for the thread from abrasion. Two rows of stitching used to attach the trim in place of the

Kevlar cording shall be considered an unacceptable alternative, since it has been proven that the two rows of stitching has insignificant impact on wear life. All trim ends shall be securely sewn into a seam for a clean finished appearance.

H. **SEWN ON RETRO-REFLECTIVE LETTERING**

Each jacket shall have the following Retro-Reflective Lettering

Three inch lime/yellow Reflexite® Brilliance® lettering on Row A reading: **DELRAY**
Three inch lime/yellow Reflexite® Brilliance® lettering on Row B reading: **BEACH**

I. **HANGING LETTER PATCH**

The hanging letter patch shall be constructed of a double layer of outer shell material. The letter patch will attach to the rear inside hem of the jacket with a combination of snap fasteners and FR Velcro® hook & loop fastener tape. Three inch letters shall be sewn on the hanging letter patch with firefighter's name.

J. **COLLAR & FREE HANGING THROAT TAB**

The collar shall consist of a minimum four-layer construction and be of one-piece design. There shall be two layers of specified moisture barrier material sandwiched in between two layers of outer shell fabric (see Moisture Barrier section). The forward inside ply of moisture barrier shall be sewn to the inside of the collar along the edges only. The multi-layered configuration shall provide protection from water and other hazardous elements, while maintaining thermal protection. The collar shall be a minimum of three inches high and graded to chest size. The leading edges of the collar shall extend up evenly from the leading edges of the jacket front body panels so that no gap occurs at the throat area. The collar back layers of outer shell and moisture barrier shall be joined to the body panels with a minimum of two rows of stitching. The collar front layers of outer shell and moisture barrier fabric shall have a series of six snap fasteners spaced equidistant to minimize gaps on lower edge of the collar. The top most collar shall be turned under and finished such that the snaps on the collar will not be able to contact the wearer's skin. There shall be six corresponding snap fasteners on a moisture barrier leader, which is sewn to the thermal liner system to engage the snaps on the collar. The snaps on the thermal liner system leader will be installed such that they do not penetrate from the outer shell through to the inner layers. This moisture barrier leader on the thermal liner system shall be sandwiched between the underside of the top collar shell fabric and moisture barrier material and the bottom collar shell fabric and moisture barrier material so as to reduce the possibility of liner detachment while donning and doffing.

The throat tab shall be a scoop type design and constructed of two plies of outer shell material with two center plies of moisture barrier material. The throat tab shall measure not less than three inches wide at the center tapering to two inches at each end with a total length of approximately nine inches. The throat tab will be attached to the right side of the collar by a one inch wide by one inch long piece of Nomex® twill webbing. The throat tab shall be secured in the closed and stowed position with FR Velcro® hook and loop fastener tape. The FR Velcro® hook and loop fastener tape shall be oriented to prevent exposure to the environment when the throat tab is in the closed position. Two, one inch x three inch pieces of FR Velcro® loop fastener tape shall be sewn vertically to the inside of each end of the throat tab. Corresponding pieces of FR Velcro® hook fastener tape measuring one inch by three inches shall be sewn horizontally to the leading outside edge of the collar on

each side, for attachment and adjustment when in the closed position and wearing a breathing apparatus mask. In order to provide a means of storage for the throat tab when not in use, a one inch by three inch piece of FR Velcro® hook fastener tape shall be sewn horizontally to the inside of the throat tab immediately under the one inch by three inch pieces of FR Velcro® loop fastener tape. The collar closure strap shall fold in half for storage with the FR Velcro® loop fastener tape engaging the FR Velcro® hook fastener tape.

A hanger loop constructed of a double layer of outer shell material shall be sewn to the top of the collar at the center.

K. **JACKET FRONT**

The jacket shall incorporate separate facings to ensure there is no interruption in thermal or moisture protection in the front closure area. The facings shall measure approximately two inches wide, extend from collar to hem, and be double stitched to the underside of the outer shell at the leading edges of the front body panels. A breathable moisture barrier material shall be sewn to the jacket facings and configured such that it is sandwiched between the jacket facing and the inside of the respective body panel. The breathable film side shall face inward to protect it. There shall be wicking barrier constructed of Crosstech® 2F moisture barrier material installed on the front closure system on the left and right side directly below the front facings to ensure continuous protection and overlap. The wicking barrier shall extend no more than a maximum of o/." beyond the inner facing and false facing shall be unacceptable. The thermal liner and moisture barrier assembly shall be attached to the jacket facings by means of snap fasteners.

L. **STORM FLAP**

A rectangular storm flap measuring approximately three inches (six inches for hook and 'D' inside/FR Velcro® outside closure; aka #7C) wide and a minimum of 23 inches long (based on a 32 inch jacket) shall be centered over the left and right body panels to ensure there is no interruption in thermal or moisture protection in the front of the jacket. The outside storm flap shall be constructed of two plies of outer shell material with a center ply of breathable moisture barrier material. The outside storm flap shall be double stitched to the right side body panel and shall be reinforced at the top and bottom with bartacks.

M. **STORM FLAP AND JACKET FRONT CLOSURE SYSTEM**

The jacket shall be closed by means of a 22 inch size #10 heavy duty high-temp smooth-gliding zipper such as a YKK Vision® on the jacket fronts and FR Velcro® fastener tape on the storm flap. The teeth of the zipper shall be mounted on black Nomex® tape and shall be sewn into the respective jacket facings. The storm flap shall close over the left and right jacket body panels and shall be secured with FR Velcro® fastener tape. A 1-1/2 inch piece of FR Velcro® loop fastener tape shall be installed along the leading edge of the storm flap on the underside with four rows of stitching. A corresponding 1-1/2 inch piece of FR Velcro hook fastener tape shall be sewn with four rows of stitching to the front body panel and positioned to engage the loop fastener tape when the storm flap is closed over the front of the jacket.

N. **CARGO/HAND WARMER EXPANSION (BELLOWS) POCKETS**

Each jacket front body panel shall have a two inch deep by eight inch wide by eight inch high expansion pocket, double stitched to it and shall be located such that the bottom of the pockets are at the bottom of the jacket for full functionality when used with an SCBA. Retro-reflective trim shall run over the bottom of the pockets so as not to interrupt the trim stripe. Two rust resistant metal drain eyelets shall be installed in the bottom of each expansion pocket to facilitate drainage of water.

The expansion pocket shall be reinforced with a layer of Kevlar® approximately five inches up on the inside of the pocket. The pocket flaps shall be rectangular in shape, constructed of two layers of outer shell material and shall measure three inches deeper than the pocket expansion and ½ inch wider than the pocket. The upper pocket corners shall be reinforced with proven backtacks and pocket flaps shall be reinforced with bartacks. The pocket flaps shall be closed by means of FR Velcro® fastener tape. Two pieces of 1-1/2 inch by three inch FR Velcro® hook fastener tape shall be installed vertically on the inside of each pocket flap (one piece on each end). Two corresponding pieces of 1-1/2 inch by three inch FR Velcro® loop fastener tape shall be installed horizontally on the outside of each pocket near the top (one piece on each end) and positioned to engage the hook fastener tape.

Additionally, a separate hand warmer pocket compartment will be provided under the expandable cargo pocket. This compartment will be accessed from the rear of the pocket and shall be lined with Nomex® Fleece for warmth and comfort. Shell material linings shall not be considered acceptable.

M. **SLEEVES**

The sleeves shall be of two piece construction and contoured, having an upper and a lower sleeve. Both the under and upper sleeve shall be graded in proportion to the chest size. For unrestricted movement, on the underside of each sleeve there shall be two outward facing pleats located on the front and back portion of the sleeve on the shell and thermal liner. On the moisture barrier, the system will consist of two darts, rather than pleats, to allow added length in the under sleeve. The moisture barrier darts will be seam sealed to assure liquid resistance integrity.

The pleats shall expand in response to upper arm movement and shall fold in on themselves when the arms are at rest. This expansion shall allow for greater multi-directional mobility and flexibility in the shoulder and arm areas, with little restriction or jacket rise. Neither stove-pipe nor raglan-style sleeve designs will be considered acceptable.

N. **SLEEVE CUFF REINFORCEMENTS**

The sleeve cuffs shall be reinforced with black Ara-Shield® material.

The cuff reinforcements shall not be less than two inch in width and folded in half, approximately one half inside and one half outside the sleeve end for greater strength and abrasion resistance. The cuff reinforcement shall be double stitched to the sleeve end; a single row of stitching shall be considered unacceptable. This independent cuff provides an additional layer of protection as compared to a turned and stitched cuff. Jackets finished with a turned and stitched cuff do not provide the

same level of abrasion resistance and will be considered unacceptable.

O. **WRISTLETS / ELASTICIZED ADJUSTABLE SLEEVE WELLS**

Each jacket shall be equipped with:

Nomex® hand and wrist guards (over the hand) not less than seven inches in length and of double thickness. A separate thumbhole with an approximate diameter of two inches shall be recessed approximately one inch from the leading edge. Nomex® knit is constructed of 96% Nomex® and 4% Spandex for shape retention. The color of the wristlets shall be grey.

The wristlets shall be sewn to the end of the liner sleeves. Flame resistant neoprene coated cotton/polyester impermeable barrier material shall be sewn to the inside of the sleeve shell approximately 5 inches from the sleeve end and extending toward the cuff forming the sleeve well. The neoprene sleeve well shall form an elasticized cuff end with an FR Velcro® tab providing a snug fit at the wrist and covering the knit wristlet. This sleeve well configuration serves to prevent water and other hazardous elements from entering the sleeves when the arms are raised.

The neoprene barrier material shall also line the inside of the sleeve shell from the cuff to a point approximately five inches back, where it joins the sleeve well and is double stitched to the shell. Four Ara-shield snap tabs will be sewn into the juncture of the sleeve well and wristlet. The tabs will be spaced equidistant from each other and shall be fitted with female snap fasteners to accommodate corresponding male snaps in the liner sleeves. One of the Ara-shield® snap tabs shall be a different color in the liner to correspond with color coded snap tabs for ease of matching the liner system to the outer shell after inspection or cleaning is completed. This configuration will ensure there is no interruption in protection between the sleeve liner and wristlet.

P. **LINER ELBOW THERMAL ENHANCEMENT**

An additional layer of thermal liner material shall be sewn to the elbow area of the liner system for added protection at contact points and increased thermal insulation in this high compression area. The elbow thermal enhancement layers shall be sandwiched between the thermal liner and moisture barrier layers of the liner system and shall be stitched to the thermal liner layer only. Finished dimension shall be approximately five inches x eight inches. All edges shall be finished by means of overedging. Raw or unfinished edges shall be considered unacceptable. Thermal scraps shall not be substituted for full-cut fabric padding.

Q. **ELBOW REINFORCEMENTS**

The elbows of the outer shell sleeves shall be reinforced with black Ara-Shield® material.

The outer shell elbow reinforcements shall be of a one piece design, and shall incorporate a layer of Arafil material sewn beneath the elbow reinforcement to insure compliance with the stored energy test requirements. The elbow reinforcement shall measure approximately 6-1/2 inches x eight inches, and shall be double stitched onto the outer sleeve shell.

R. **PADDED ELBOWS**

Padding for the elbows shall be accomplished with one layer of neoprene coated aramid batt. The coated aramid batt shall be sandwiched between the shell and the elbow reinforcement layers. The neoprene shall face outward.

S. **LINER SHOULDER AND UPPER BACK THERMAL ENHANCEMENT**

A minimum of one additional layer of thermal liner material shall be used to increase thermal insulation in the upper back, front and shoulder area of the liner system. This full-cut thermal enhancement layer shall drape over the top of each shoulder extending from the collar to the sleeve/shoulder seam, down the front approximately five inches from the juncture of the collar down the back to a depth of seveninches to provide greater CCHR protection in this high compression area. The upper back, front and shoulder thermal enhancement layers shall be sandwiched between the thermal liner and moisture barrier layers of the liner system and shall be stitched to the thermal liner layer only. The thermal enhancement layer shall have finished edges by means of overedging. Raw or unfinished edges shall be considered unacceptable. Thermal scraps shall not be substituted for full-cut fabric padding. Smaller CCHR reinforcements shall not be considered acceptable since they provide far less area of coverage.

T. **SHOULDER REINFORCEMENT**

The tops of the shoulders (front yoke) of the outer shell shall be reinforced on the outside with an extra layer of outer shell material.

The additional shoulder reinforcement layer shall also serve to increase thermal insulation to the shoulder area. The reinforcements shall be double stitched to the shell and shall measure approximately four inches wide near the collar and approximately six inches wide at the juncture of the sleeve and body panels.

U. **MICROPHONE STRAPS** (2)

A strap shall be constructed to hold a microphone for a portable radio. It shall be sewn to the jacket at the ends only. The size of the microphone straps shall be one inch x three inches.

The microphone strap shall be mounted on the left and the right, upper front, slanted upward and shall be constructed of double layer outer shell material.

V. **FLASHLIGHT SNAP & STRAP**

The jackets shall be equipped with a flashlight retainer strap. An inward facing metal helmet snap, attached to a double thickness leather tab, shall be double riveted in a vertical position to the upper chest. A double thickness strap of outer shell material measuring approximately one inch by twelve inches shall be double stitched to the jacket in the middle of the strap approximately 6 inches below the safety hook. One inch by four inch FR Velcro® fastener tape shall be attached to the loose ends of the strap so that they may be joined together around the flashlight. The retainer strap shall be located on the right chest.

13. **PANT CONSTRUCT/ON**

A. **BODY**

The body of the shell shall be constructed of four separate body panels consisting of two front panels and two back panels. The body panels shall be shaped so as to provide a tailored fit, thereby enhancing body movement, and shall be joined

together by double stitching with Nomex® thread. The body panels and seam lengths shall be graded to size to assure accurate fit in a broad range of sizes.

The front body panels will be wider than the rear body panels to provide more fullness over the knee area. This is accomplished by rolling the side leg seams (inside and outside) to the rear of the pant leg beginning at the knee. The slight taper will prevent premature wear of the side seams by pushing them back and away from the primary high abrasion areas encountered on the sides of the lower legs.

B. **PANT LINER SYSTEM**

The combined moisture barrier and the thermal liner shall be completely removable for the pant. The thermal liner and moisture barrier layers of the liner system shall be stitched together and bound around the top waist and cuffs with Bias-Cut Neoprene coated cotton/polyester binding for a finished appearance that prevents fraying and wicking of contaminants.

The body of the liner system (thermal liner and moisture barrier) shall be of a four piece design to match the cut of the shell to include the rolled back side seams. The design of the liner system will incorporate darts in the knee area providing a contour to the leg and will also have a reverse boot cut at the rear of the liner cuff and a concave cut at the front to keep the liner from hanging below the shell.

The liner system shall have a reinforcement of black *Nomel* twill sewn to the bottom of the fly opening. This reinforcement will serve to prevent the liner from tearing in that area from the constant donning and doffing of the pants.

C. **LINER ACCESS OPENING - PANT**

The liner system of the pant shall incorporate a full length opening along the entire waistline for ease in inspecting the inner layers as well as performing the complete Liner Inspection. The thermal liner and moisture barrier shall be individually bound with a neoprene coated bias cut tape, and joined together with a snap at the center back. There shall be a minimum of 4 snap tabs sewn to the underside of the waistband, with corresponding snaps in the moisture barrier layer to secure the barrier to the shell. As described previously, the pant thermal layer snaps directly to the independent waistband by means of nine snap fasteners. There shall be no hook and loop used to close the liner access opening.

D. **WAISTBAND**

The pant design facilitates the transfer of the weight of the pant to the hips instead of the shoulders and suspenders. The waist area of the pants shall be reinforced on the inside with a separate piece of black aramid outer shell material not less than two inches in width. Neoprene coated cotton/polyester shall be sewn to the back of the waistband as a reinforcement. The aramid/Neoprene waistband shall be cut on the bias to allow the waistband to stretch for unrestricted movement and increased comfort. The top edge of the waistband reinforcement shall be double stitched to the outer shell at the top of the pants. The lower edge of the waistband shall be serged and unattached to the shell to accept the thermal liner and moisture barrier. The top of the thermal liner and moisture barrier shall be secured to the underside of the waistband reinforcement so as to be sandwiched between the waistband reinforcement and outer shell to reduce the possibility of liner detachment while

donning and to avoid pass through of snaps from the outer shell to the inner liner.

E. **LACK ARAMID BELT WITH BELT LOOPS, ZIPPER FLY AND ADDITIONAL LOOP**

Each pant shall include a 2 inch wide belt constructed of aramid webbing material with an adjustable hi-temp thermoplastic Delrin® buckle serving as the exterior primary positive locking closure. This buckle shall also provide a quick-release mechanism for donning and doffing. The pants shall be equipped with a minimum of 3 outer shell material belt loops, spaced around the waist to accommodate the aramid belt. A zipper closure shall also be provided. A carabiner hold down loop shall also be sewn on the right side belt loop above.

F. **EXTERNAL/INTERNAL FLY FLAP**

The pants will have a vertical outside fly flap constructed of two layers of outer shell material, with a layer of moisture barrier material sandwiched between. The fly flap shall be double stitched to the left front body panel and shall measure approximately 2 % inches wide, with a length graded to size based on waist measurement and reinforced with bartacks at the base. An internal fly flap constructed of one layer of outer shell material, thermal liner and specified moisture barrier, measuring approximately 2 inches wide, with a length graded to size based on waist, shall be sewn to the leading edge of the right front body panel. The inside of the right front body panel shall be thermally enhanced directly under the outside fly with a layer of moisture barrier and thermal liner material.

The underside of the outside fly flap shall have a 1*Yi* inch wide piece of FR Velcro® loop fastener tape quadruple stitched along the full length and through the shell material only; stitching shall not penetrate the moisture barrier insert between the two layers to insure greater thermal protection and reduced water penetration. A corresponding strip of 1*Yi* inch wide piece of FR Velcro® hook fastener tape shall be quadruple stitched to the outside right front body panel securing the fly in a closed position.

Appropriate snap fastener halves shall be installed at the leading edge of the waistband for the purpose of further securing the pants in the closed position.

G. **RETRO-REFLECTIVE FLUORESCENT TRIM**

The pants shall have a stripe of retro-reflective fluorescent trim encircling each leg below the knee to comply with the requirements of NFPA #1971 in 3 inch lime/yellow Reflexite® Brilliance® with stripe.

Bottom of trim band shall be located approximately 3" above cuff.

H. **REINFORCED TRIM STITCHING**

All reflective trim is secured to the outer shell with Nomex® thread, using a locking chain stitch protected by our Kevlar cording. This strip of 3/32-inch strong, durable, flame resistant black Kevlar® cording provides a bed for the stitching along each edge of the retro-reflective fluorescent trim surface and affords extra protection for the thread from abrasion. Two rows of stitching used to attach the trim in place of the Kevlar cording shall be considered an unacceptable alternative, since it has

been proven that the two rows of stitching has insignificant impact on wear life. All trim ends shall be securely sewn into a seam for a clean finished appearance.

I. **SEAT**

The rise of the rear pant center back seam, from the top back of the waistband to where it intersects the inside leg seams at the crotch, shall exceed the rise at the front of the pant by 8 inches. The longer rear center back seam provides added fullness to the seat area for extreme mobility without restriction when stepping up or crouching and will be graded to size. This feature in combination with other design elements will maintain alignment of the knee directly over the knee pads when kneeling and crawling.

J. **EXPANSION (BELLOWS) POCKETS (Left) WITH 3 PACK ARASHIELD TOOL POUCH**

One 2 inch deep by 1O inch wide by 1O inch bellows pockets shall be placed over the outer leg seams at thigh level. The pockets shall be sewn to the pant with two rows of lock stitching and shall provide two aluminum eyelets, installed at the bottom of each pocket, for water drainage. *Each pocket shall be reinforced with an additional layer of outer shell material sewn to the inside.* The pocket flaps shall be rectangular in shape, constructed of two layers of outer shell material and double stitched to the outer shell. One piece of 1*Yi* inch by 3 inch FR hook fastener tape on the inside of each pocket flap on each side. One piece of corresponding 1*Yi* inch by 3 inch FR loop fastener tape shall be installed horizontally on the outside of each side of pocket near the top and positioned to engage the hook fastener tape. Each pocket flap shall be reinforced with bartacks at the uppermost corners. There shall be a pocket divider inside of the pocket made of Black Arashield, divided into three compartments to store tools.

K. **EXPANSION (BELLOWS) POCKETS (Right)**

One, two inch deep x ten inch wide x ten inch bellows pockets shall be placed over the outer leg seam at thigh level. The pocket shall be sewn to the pant with two rows of lock stitching and shall provide two aluminum eyelets, installed at the bottom of each pocket, for water drainage. Each pocket shall be reinforced with an additional layer of outer shell material sewn to the inside. The pocket flap shall be rectangular in shape and measure a minimum of six inches by a minimum of eleven inches, constructed of two layers of outer shell material and double stitched to the outer shell. Three pieces of 1-1/2 inch by approximately five inch FR Velcro® hook fastener tape shall be installed vertically on the inside of each pocket flap (one each side and one in the middle). One continuous piece of corresponding approximately 1-1/2 inch by nine inch FR loop fastener tape shall be installed horizontally on the outside of the pocket near the top and positioned to engage the hook fastener tape. The pocket flap shall be reinforced with bartacks at the uppermost corners. A two-piece loop constructed of a double layer of outer shell material will be installed under the front edge of the pocket flap.

The top and bottom of the loop will attach to each other with a one inch x one inch FR Velcro® hook & loop fastener tape sewn to ends. Inside the pocket, a strap measuring 1-1/2 inches by *9*-1/2 inches (when Velcro® is engaged) shall run the full vertical height of the pocket where it will secure at the top with hook and loop fastener tape. A second strap shall be installed horizontally at the top of the pocket. This strap will measure one inch by four inches and shall be sewn at one end and

attach at the other end with hook and loop fastener tape. The straps are specially designed to secure the contents of the pocket and allow for quick release

L. **EXPANSION POCKET REINFORCEMENTS INSIDE AND OUTSIDE**

The lower half of the expansion pockets shall be reinforced on the outside with black Ara-Shield® material and on the inside with a full Kevlar pouch.

M. **LOWER LEG POCKET**

A pocket shall be sewn on the lower right leg to accommodate a channel lock rescue tool, with an approximate size of two inches x three inches x eight inches.

N. **KNEE**

The outer shell of the pant legs shall be constructed with horizontal expansion pleats in the knee area with corresponding darts in the liner to provide added fullness for increased freedom of movement and maximum flexibility. The pleats shall be folded to open outwardly towards the side seams to insure no restriction of movement. The knee will be installed proportionate to the pant inseam, in such a manner that it falls in an anatomically correct knee location.

The thermal liner shall be constructed with four pleats per leg in the front of the knee. Two will be located above the knee (one on each side) and two will be located below the knee (one on each side). On the moisture barrier, the system will consist of two darts, rather than pleats, to allow added length in the under knee. The darts in the liner provide a natural bend at the knee. The pleats and darts in the liner work in conjunction with the expansion panels in the outer shell to increase freedom of movement when kneeling, crawling, climbing stairs or ladders, etc.

O. **LINER KNEE THERMAL ENHANCEMENT**

A minimum of one additional layer of specified thermal liner and one additional layer of moisture barrier material, measuring a minimum of nine inches by eleven inches, will be sewn to the knee area of the liner system for added CCHR protection and increased thermal insulation in this high compression area. The knee thermal enhancement layers shall be sandwiched between the thermal liner and moisture barrier layers of the liner system and shall be stitched to the thermal liner layer only. The thermal enhancement layer shall have finished edges by means of over edging. Raw or unfinished edges shall be considered unacceptable. Thermal scraps shall not be substituted for full-cut fabric padding. Smaller CCHR reinforcements shall not be considered acceptable since they provide far less area of coverage.

P. **KNEE REINFORCEMENTS**

The knee area shall be reinforced with black Ara-Shield® material. The knee reinforcement shall be centered on the leg to insure proper coverage when bending, kneeling and crawling. The knee reinforcements shall measure nine inches wide x twelve inches high and shall be double stitched to the outside of the outer shell in the knee area for greater strength and abrasion resistance. Knee reinforcements of a smaller size do not provide the same protective coverage and shall be considered unacceptable. The knee reinforcements specified shall be removable without opening up any seams of the outer shell of the pant.

The lower edge of the Ara-Shield® knee reinforcement shall be turned under so that

the lower row of stitching is covered and protected from abrasion.

Q. **PADDING UNDER KNEE REINFORCEMENTS**

Padding for the knees shall be accomplished with one layer of **Silizone**® foam sewn to the liner, sandwiched between the thermal liner and moisture barrier.

R. **PANT CUFF REINFORCEMENTS**

The cuff area of the pants shall be reinforced with black Ara-Shield® material. The cuff reinforcement shall not be less than two inch in width and folded in half, approximately one half inside and one half outside the end of the legs for greater strength and abrasion resistance. The cuff reinforcement shall be double stitched to the outer shell for a minimum of two rows of stitching. This independent cuff provides an additional layer of protection over a hemmed cuff. Pants that are turned and stitched at the cuff, as opposed to an independent cuff reinforcement, do not provide the same level of abrasion resistance and shall be considered unacceptable.

S. **PADDED RIP-CORD SUSPENDERS & ATTACHMENT**

On the inside waistband shall be attachments for the standard "H" style "Padded Rip-Cord" suspenders. There will be four attachments total: two on the front and two on the back. The suspender attachments shall be constructed of a double layer of black aramid measuring approximately 1/2 inch wide x three inches long. They shall be sewn in a horizontal position on the ends only to form a loop. The appearance will be much like a horizontal belt loop to capture the suspender ends.

A pair of "H" style "Padded Rip-Cord" suspenders shall be specially configured for use with the pants. The main body of the suspenders shall be constructed of two inch wide black webbing straps. The suspenders shall run over each shoulder to a point approximately shoulder blade high on the back, where they shall be joined by a two inch wide horizontal piece of webbing measuring approximately eight inches long, forming the "H". This shall prevent the suspenders from slipping *off* the shoulders. The shoulder area of the suspenders will be padded for comfort by fully encasing the webbing with aramid batting and wrap-around black aramid.

The rear ends of the suspenders will be sewn to two inch wide elasticized webbing extensions measuring approximately eight inches in length and terminating with thermoplastic loops. The forward ends of the suspender straps shall be equipped with specially configured black powder coat non-slip metal slides with teeth. Through the metal slides will be the nine inch lengths of strap webbing "Rip-Cords" terminating with thermoplastic loops on each end. Pulling on the "Rip-Cords" shall allow for quick adjustment of the suspenders.

Threaded through and attached to the thermoplastic loops on the forward and rear ends of the suspenders will be black aramid suspender attachments incorporating two snap fasteners . The aramid suspender attachments are to be threaded through the suspender attachment loops on the inside waistband of the pants. The aramid suspender attachments will then fold over and attach to themselves securing the suspender to the pants.

T. **REVERSE BOOT CUT**

The outer shell pant leg cuffs will be constructed such that the back of the leg is

approximately one inch shorter than the front. The liner will also have a reverse boot cut at the rear of the cuff and a concave cut at the front to keep the liner from hanging below the shell. This construction feature will minimize the chance of premature wear of the cuffs and injuries due to falls as a result of "walking" on the pant cuffs.

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