07 JULY 2009

PURCHASE DESCRIPTION
BODY ARMOR, MULTIPLE THREAT / INTERCEPTOR
IMPROVED MODULAR TACTICAL VEST

1. SCOPE

1.1 Description. This purchase description provides for a multiple threat body armor system consisting of a base vest and modular components for tailoring protection levels to defeat multiple ballistic hazards across the battlefield continuum and manage armor weight. The Improved Modular Tactical Vest (IMTV) is a critical safety item. This specification delineates system, subsystem, component, and subcomponent level performance requirements to accomplish the end item body armor performance (see paragraph 6.1). Body armor, multiple threat is functionally integrated with Modular Lightweight Load Equipment (MOLLE).

1.2 Classification. Body armor, multiple threat components; base vest assembly, throat, yoke and collar assembly, lower back protector assembly, groin protector assembly, cummerbund assembly, side plate pockets, rifle bolster, small arms protective inserts (SAPI, ISAPI, ESAPI, XSAPI) shall be one type in the following sizes. Body armor, multiple threat will be issued separately as three subsystems, as follows.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be used in improving this document should be addressed to: John Kirejczyk, (508) 233-4348, DSN 256-4348, John.Kirejczyk@us.army.mil, US Army Natick Soldier RDEC Kansas Street, Natick, MA 01760

A) The Improved Modular Tactical Vest (IMTV) subsystem; consisting of the base vest assembly, throat, yoke and collar assembly, lower back protector assembly, groin protector assembly, cummerbund assembly, two side-small arms protective insert pouches and rifle bolster.

COMPONENT	SIZES
Base Vest Assembly	5 sizes; X-Small, Small, Medium, Large, X-Large
Yoke and Collar Assembly	5 sizes: X--Small, Small, Medium, Large, X-Large
Throat Protector	One size
Lower Back Protector Assembly	One size
Groin Protector Assembly	2 sizes: X-Small to Medium, Large to X-Large
Cummerbund Assembly	3 sizes; X-Small-Small, Medium, Large-X-Large
Side Plate Pockets	One size; one set
Rifle Bolster	One size

B) The SAPI subsystem; consisting of a set of SAPI, ISAPI, ESAPI and XSAPI in the same size as the IMTV.

COMPONENT	SIZES
Small Arms Protective Insert (SAPI, ISAPI, ESAPI, XSAPI)	5 sizes: X-Small, Small, Medium, Large, X-Large

C) The Enhanced Side Small Arms Protective Insert (E-SSAPI) or Enhance Side Ballistic Insert (ESBI) subsystem; consisting of a set of Enhanced Side-SAPI or ESBI in one standard size or a set of X-Small ESAPI.

COMPONENT	SIZES
Enhanced Side SAPI (E SSAPI)	One size
Enhanced Side Ballistic Insert (ESBI)	One size

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this performance requirement. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of

Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the Solicitation (see paragraph 6.2).

SPECIFICATIONS
DEPARTMENT OF DEFENSE

MIL-DTL-32075	- Label: For Clothing, Equipage, and Tentage (General Use).
MIL-PRF-5038	- Tape, Textile and Webbing, Textile, Reinforcing Nylon
MIL-PRF-63460	- Lubricant, Cleaner and Preservative for Weapons and Weapons Systems (Metric)
CO/PD 00-03	- Small Arms Protective Inserts (SAPI)
CO/PD 05-02	- Improved, Small Arms Protective Inserts (ISAPI)
CO/PD 04-19	- Enhanced, Small Arms Protective Inserts (ESAPI)
FQ/PD 07-03	- X Small Arms Protective Inserts (XSAPI)
CO/PD 06-20	- Enhanced Side Ballistic Insert (ESBI)
A-A-55301	- Webbing, Textile Textured or Multi-Filament
A-A-55126	- Fastener Tape, Hook and Pile, Synthetic
MIL-W-4088	- Webbing, Textile Woven Nylon
MIL-C-43734	- Cloth, Duck, Textured Nylon
MIL-STD-662F	- V50 Ballistic Test for Armor
MIL-STD-3027	- Performance Requirements and Testing of Body Armor
MIL-DTL-46593B	- PROJECTILE, CALIBERS .22, .30, .50, AND 20 mm FRAGMENT-SIMULATING
MIL-W-17337	- Webbing, Textile, Woven Nylon
A-A-59826	- Thread, Nylon
MIL-DTL-508	- Cloth, Oxford, nylon, 3 Ounce
MIL-STD-810	- Environmental Engineering Considerations and Laboratory Tests
MIL-C-7020	- Cloth, Parachute, Nylon Rip-Stop and Twill Weave
MIL-E-20652	- Eyelets, Metallic, Rolled Flange Type; and Eyelet Washer
MIL-F-10884	- Fasteners, Snap
MIL-W-5664	- Webbing, Textile Elastic

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094 or www.dsp.dla.mil using Assist Quick Search).

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

MANUALS

TM 10-8400-203-23 General Repair Procedures for Individual Equipment; Chapter 25, Maintenance of Interceptor Body Armor System
GSA Federal Standardization Manual 2000

TEST OPERATING PROCEDURES

USATECOM ITOP 4-2-805 Projectile Velocity and Time of Flight Measurements

Requests for above may be addressed to Defense Technical Information Center (DTIC), 8725 John J. Kingman Road, Suite 0944, Ft. Belvoir, VA 22060-6218, (703) 767-8274, http://stinet.dtic.mil/, or msorders@dtic.mil

(Copies of drawings, publications, and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.3 Non-government publications. The following documents forms a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are Department of Defense adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see paragraph 6.2).

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC METHOD 8	- Colorfastness to Crocking; AATCC Crockmeter Method
AATCC METHOD 15	- Colorfastness to Perspiration
AATCC METHOD 16	- Colorfastness to Light
AATCC METHOD 22	- Water Repellency; Spray Test
AATCC METHOD 61	- Colorfastness to Laundering, Home and Commercial: Accelerated
AATCC METHOD 70	- Water Repellency: Tumble Jar Dynamic Absorption Test
AATCC METHOD 96	- Dimensional Changes in Commercial Laundering of Woven and Knitted Fabrics Except Wool
AATCC METHOD 118	- Oil Repellency: Hydrocarbon Resistance Test
AATCC METHOD 119	- Color Change Due to Flat Abrasion (Frosting): Screen Wire Method
AATCC METHOD 127	- Water Resistance: Hydrostatic Pressure Test
AATCC Procedure 1	- Gray Scale for Color Change
AATCC Procedure 2	- Gray Scale for Staining

(Applications for copies should be addressed to the American Association of Textile Chemists and Colorists, PO Box 12215, Research Triangle Park, NC 27709-2215 or www.aatcc.org).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D-204	- Sewing Threads
ASTM D-1388	- Stiffness of Fabrics
ASTM D 1424	- Tearing Strength of Woven Fabrics by Falling-Pendulum Type (Elmendorf) Apparatus
ASTM D-1683	- Failure in Sewn Seams of Woven Fabrics
ASTM D-1693	- Standard Practice for Stitches and Seams
ASTM D-1777	- Standard Method for Testing Thickness of Textile Materials
ASTM D-3575	- Materials, Flexible Cellular, Made From Olefin Polymers

ASTM D-3776	- Mass Per Unit Area (Weight) of Woven Fabric
ASTM D-3884	- Abrasion Resistance of Textile Fabrics, (Rotary Platform, Double Head Method)
ASTM D-3886	- Abrasion Resistance of Textile Fabrics, (Inflated Diaphragm)
ASTM D-4485	- Standard Specification for Performance of Engine Oils
ASTM D-5034	- Breaking Force and Elongation of Textile Fabrics (Grab Test)
ASTM D-6193	- Standard Practice for Stitches & Seam
ASTM G21-90	- Test Methods for Evaluation of Effect of Fungi on Synthetic Polymeric Materials

(Applications for copies should be addressed to ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959 or www.astm.org)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
ANSI/ASQ Z1.4-2003 - Sampling Procedures and Tables for Inspection by Attributes

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)
International Standard 11092: 1993 - Measurement of thermal and water vapor resistance under steady state conditions

(Applications for copies should be addressed to the American National Standards Institute, 25 West 43rd Street, 4th Fl., New York, New York, 10036, Tel: (212)642-4900, Fax: (212)398-0023, http://www.ansi.org).

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First Article Test and Lot Acceptance Test. When specified, complete Body armor, multiple threat samples, representing full production quality, shall be subjected to First Article Testing in accordance with 4.2 or Lot Acceptance Testing in accordance with 4.3.

3.2 Materials and Components. The materials and components shall conform to applicable specifications, standards, and patterns required herein.

3.2.1 Cloth Outer and Inner Shell. The cloth(s) utilized to fabricate the outer shell and inner shell shall be made from lightweight, durable, synthetic cloths meeting the characteristics outlined in Appendix A, Table I when tested as specified in paragraph 4.5 (Appendix C, Table I). Color: Coyote 498.

3.2.1.1 Weight of Finished Fabric: The weight of the finished outer shell fabric shall be no greater than 12.0 oz/sqyd. The weight of the finished middle and inner shell fabric shall be no greater than 8.0 oz/sqyd.

3.2.2 Cloth Collar, Throat Protector, and Front Vest Inner Liner Material. The material next to the skin (paragraphs 3.3.1.7, 3.3.1.12, 3.3.1.24) shall be highly abrasion resistant, non-abrasive to skin, pliable to enable collar to roll down, resistant to oil penetration and dry rot and able to remove oils when cleaned, such as, MIL-C-508, Oxford, Nylon, 3 oz Type I, Class 3. Color: Coyote 498.

3.2.3 Cloth Ballistic Panel Cover. Ballistic panel cover shall be 70 Denier 1.9 oz. Nylon Ripstop. Color: Tan 380.

3.2.4 Webbing and Tapes. Webbings and tapes shall be heat cut smooth with no burrs or residual melt. Webbings and tapes shall conform to the following requirements.

a) 1.0 inch Webbing; A-A-55301, Type III, except that the spectral reflectance requirements shall be in accordance with paragraph. 3.4.6 (Appendix A, Table IV) when tested in accordance with paragraph 4.5.9. Color: Coyote 498.

b) 1.5 inch Webbing; A-A-55301, Type VI, except that the spectral reflectance requirements shall be in accordance with paragraph. 3.4.6 (Appendix A, Table IV) when tested in accordance with paragraph 4.5.9. Producer colored, textured yarns may be used. When used, thickness shall be .039 in. (min); weight shall be .90 oz/yd (min). Color: Coyote 498.

c) 2.0 inch Webbing; MIL-W-17337, except that the spectral reflectance requirements shall be in accordance with paragraph. 3.4.6 (Appendix A, Table IV) when tested in accordance with paragraph 4.5.9. Producer colored, textured yarns may be used. When used, continuous filament textured nylon yarn denier shall be 1000 warp and 500 fill; breaking strength shall be 1450 lb (min); thickness shall be .042 in. (min) to .054 in. (max); filling yarns per inch shall be 40; full warp ends shall be 160; and width binder ends shall be 38. Color: Coyote 498.

d) 3.0 inch Webbing; MIL-W-17337 Class 2, continuous filament textured nylon shall be used. Color: Coyote 498.

e) 1.0 inch Tape; MIL-PRF-5038, Type III, class 2, continuous filament textured yarns shall be used except that the spectral reflectance requirements shall be in accordance with paragraph. 3.4.6 (Appendix A, Table IV) when tested in accordance with paragraph 4.5.9. Color: Coyote 498.

3.2.4.1 Matching, Webbing. The color of the webbing shall match the solid Coyote 498 shade IMTV outer shell standard sample when viewed under filtered tungsten lamp which approximates artificial daylight having a correlated color temperature of 7500+/- 200K, with illumination of 100 +/- 20 foot candles, and shall be a good match to the standard sample under incandescent lamplight at 2300 +/- 200 K.

3.2.5 Elastic. Elastic shall be heat cut smooth with no burrs or residual melt. Elastic shall conform to the following requirements.

a) 3 inch; width – 3 inch ±.060, construction – knitted, warp – textured polyester 150/1, filler – textured polyester 750d total, rubber – natural or equivalent, rubber strands – 60, thickness - .040-.045, picks per inch – 50 ±4, stretch – 110% ±15%. Color: Black.

3.2.6 Fasteners, Hook, and Loop. Hook and loop fasteners shall conform to A-A-55126, Type II, Class 1, in 1.0", 1.5", 2.0", and 4.0" widths. Color: Coyote 498.

3.2.7 Foam. The foam, located within the side plate pockets and back foam pocket, shall be closed cell with the properties specified in Appendix A, Table II when tested as specified in ASTM D-3575. The foam shall be sandwiched between the last layer of ballistic filler and back of the cloth inner shell.

3.2.8 Snap Fasteners. Snap fasteners shall conform to MS27980, style 2, hard action. The snap fasteners shall have a black chemical finish. The enamel shall be uniformly coated over the top surface of the shell including the visible portion of the edge. The enamel shall be capable of withstanding attachment operations without removal of any enamel. The enamel coating shall be smooth and free of sags, runs, and streaks (see 4.5).

3.2.9 Polyethylene. 0.030 ±.005 inches thick, high density per paragraph 3.3.1.3 Item 18 and 3.3.1.26. 0.045 ±.005 inches thick, high density per paragraph. 3.3.1.3 Item 19. Color: Natural.

3.2.10 Cable. 3/32 Galvanized 7x7 aircraft cable coated to 5/32 +.006/-.0 with natural nylon or 3/32 Galvanized 7x7 aircraft cable coated to .165 +/-.006 with natural nylon. Ends of cable shall have no exposed metal.

3.2.11 Cable Sleeves. 5/32 copper sleeves.

3.2.12 Thread. Thread, Nylon, Bonded, Size F, A-A-59826, Type II, Class A. Color: Coyote 498.

3.2.13 Rifle Bolster Coated Fabric. Hypalon Coated Nylon, 16 oz/yd2 Reeves Air Safety Products, or equal. Color: Coyote 498.

3.2.14 Rifle Bolster Stiffener. Multipurpose rubber hose, OD 1 inch.

3.2.15 Male Buckle. 40 mm Single Bar Stealth Male, acetal, P/N 6581, or equal. Color: Coyote 498. Spectral reflectance requirements shall be in accordance with paragraph. 3.4.6 (Appendix A, Table IV) when tested in accordance with paragraph 4.5.9.

3.2.16 Female Repairable Buckle. 40 mm Quick Attach Stealth Female, acetal, P/N 9276, or equal. Color: Coyote 498. Spectral reflectance requirements shall be in accordance with paragraph. 3.4.6 (Appendix A, Table IV) when tested in accordance with paragraph 4.5.9.

3.2.17 Tension Lock.. Trovato Ladderloc TLL 150 acetal P/N 154-0150-xxxx, or equal. Color: Coyote 498. Spectral reflectance requirements shall be in accordance with paragraph. 3.4.6 (Appendix A, Table IV) when tested in accordance with paragraph 4.5.9.

3.2.18 Loop. 1.5 inch Steel or brass, Welded ITW P/N 01041-20-2188x, or equal. Color: Coyote 498.

3.2.19 Grommet. Plain, brass, black oxide, NASM16491, size 0, type I, class 3

3.2.20 Washer. Plain, brass, black oxide, NASM16491, size 0, type I, class 3

3.2.21 Quick Release Handle Cover. Polyvinyl chloride tubing. OD 0.380 + 0.005 inches, ID 0.250 + 0.005 inches Color. Tan 499.

3.2.22 Cord. Dacron cord poly-braided FED SPEC.#T-C-2754-I Dacron ¼", Tensile strength 250 lbs. Color: White

3.3 Design. The Body armor, multiple threat model dismounted system is a modular vest protecting the upper torso from multiple ballistic threats which is easily configured to defeat predicted mission threat at a minimum system weight. The IMTV subsystem (see 3.5) consists of (1) one base vest assembly made up of an outer shell base vest carrier with a ballistic insert set made up of removable ballistic (front and back) inserts, and one set of shoulder straps, (2) one yoke and collar assembly with non-removable ballistic inserts, (3) one throat protector which attaches to the front base vest and collar with non-removable ballistic insert, (4) one groin protector assembly made up of a groin protector carrier with non-removable ballistic insert, (5) one lower back protector assembly made up of a lower pack protector carrier with non-removable ballistic insert, (6) one cummerbund assembly consisting of two interchangeable left and right sides, two interchangeable cummerbund adapters and one emergency release cable, (7) two side plate pockets, (8) one rifle bolster capable of being attached to either the left or right side of the front base vest. Components are attached to the IMTV. The IMTV provides protection from conventional fragmenting munitions and multiple hits from 9mm handgun rounds. The SAPI, ISAPI, ESAPI or XSAPI subsystem consists of a set of interchangeable, sized, and contoured plates inserted into front and back pockets inside the IMTV to provide vital organs protection against multi-hits of small arms rifle bullets and indirect fire flechettes. The Enhance Side SAPI and Enhanced Side Ballistic Insert subsystem consists of a set of interchangeable, contoured plates inserted into the side plate pockets worn inside the left and right cummerbund. Webbing hanger attachments on the front and back of the IMTV outershell accommodate limited load carrying compatible with MOLLE modular load bearing vest pockets. The variants of Body armor, multiple threat modular system configurations follow below. Recommended enhancements are encouraged to improve its operational effectiveness and manufacturability.

a) IMTV base vest and cummerbund assembly only; which does not include any of the yoke and collar, groin protector, lower back protector, side plate pockets, or SAPI, ISAPI, ESAPI or XSAPI modular components.

b) IMTV base vest and cummerbund assembly with or without one or more, or all of the modular components; yoke and collar, groin protector, lower back protector, and/or one or two SAPI, ISAPI, ESAPI, or XSAPI and/or two Enhanced Side SAPI or Enhanced Side Ballistic Inserts.

c) IMTV base vest and cummerbund assembly with none, some, or all modular components and limited load carriage using MOLLE pockets.

3.3.1 Patterns. The Government shall furnish patterns for the baseline design from which the contractor can use applicable parts to create cutting working patterns. Compliance with patterns is required to meet interface requirements with fielded personnel combat equipment. The working patterns shall include the size, directional lines, placement marks, notches, and provided seam allowances. Baseline patterns require a 3/8" seam allowance +/-1/16" unless otherwise stated on patterns. Except for the ballistic panels, all the components of the vest shall be cut with a tolerance of +/- 1/16" in accordance with the pattern parts indicated except where changes or enhancement(s) to baseline are proposed. The ballistic panels shall be cut with a tolerance of -1/16"/+1/8" to ensure maximum protective area of coverage is achieved (see paragraph. 3.5, Appendix A, Table V-A). Drill holes are not permitted.

3.3.1.1 Base Vest and Components Carrier Outer Shell

Item	Nomenclature	Computer Nomenclature	Cut
1	BACK OUTER SHELL	IMTV-BACK OUTER SHLL	1
2	FRONT OUTER SHELL	IMTV-FRNT OUTER SHLL	1
3	FRONT OUT SHELL UPPER	IMTV-FRT OUT SHLL UP	1
4	BACK LOWER FLAP	IMTV-BACK LOWER FLAP	1
5	BACK UPPER FLAP	IMTV-BACK UPPER FLAP	1
6	FRONT LOWER FLAP	IMTV-FRONT LOWR FLAP	1
7	BACK SHOULDER HOLDER	IMTV-BACK SHLDR HOLD	2

3.3.1.2 Base Vest and Components Carrier Inner Shell

Item	Nomenclature	Computer Nomenclature	Cut
8	BACK INNER SHELL UPPER	IMTV-BACK IN SHL UPP	1
9	BACK INNER SHELL LOWER	IMTV-BACK IN SHL LOW	1
10	FRONT INNER SHELL UPPER	IMTV-FRT INN SHLL UP	1
11	FRONT INNER SHELL LOWER	IMTV-FRT INN SHLL LW	1
12	FRONT SHELL INNER FLAP	IMTV-FRT SHL INN FLP	1
13	TOP PLATE POCKET	IMTV-TOP PLATE POCKT	2
14	BOTTOM PLATE POCKET	IMTV-BTM PLATE POCKT	2
15	BACK FOAM POCKET	IMTV-BACK FOAM POCKT	1
16	USE CARE POCKET	IMTV-USE CARE POCKET	1
17	LOOP NAME TAPE REINFORCEMENT	IMTV-NAME TAPE RNFRC	1

3.3.1.3 Base Vest and Components Plastic

Item	Nomenclature	Computer Nomenclature	Cut
18	FRONT FLAP PLASTIC	IMTV-FRNT FLAP PLSTC	1
19	SHOULDER STRAP PLASTIC	PLATE-SHL STRP PLSTC	1

3.3.1.4 Base Vest and Components Ballistic Filler

Item	Nomenclature	Computer Nomenclature	Cut
20	BACK BALLISTIC	IMTV-BACK BALLISTIC	x
21	FRONT BALLISTIC	IMTV-FRONT BALLISTIC	x

3.3.1.5 Base Vest and Components Foam

Item	Nomenclature	Computer Nomenclature	Cut
22	BACK FOAM LUMBAR	IMTV-BACK FOAM	1

3.3.1.6 Base Vest and Components Ballistic Panel Cover

Item	Nomenclature	Computer Nomenclature	Cut
23	BACK BALLISTIC COVER	IMTV-BACK BLLSTC CVR	2
24	FRONT BALLISTIC COVER	IMTV-FRNT BLLSTC CVR	2

3.3.1.7 Base Vest Inner Lining

Item	Nomenclature	Computer Nomenclature	Cut
25	FRONT INNER BIB	IMTV-FRNT INNER BIB	1

3.3.1.8 Base Vest and Components 1.5” Webbing

Item	Nomenclature	Computer Nomenclature	Cut
26	SHOULDER STRAP BUCKLE	IMTV-SHOULDER STRAP	2
27	SHOULDER STRAP YIBYAB	IMTV-SHLDR STRP YBYB	1
28	FRONT SHOULDER BUCKLE	IMTV-FRONT SHLD BCKL	4
29	BACK SHOULDER BUCKLE	BACK SHOULDER BUCKLE	2
30	FRONT FLAP PULL BOTTOM	IMTV-FRONT FLAP PULL	1

3.3.1.9 Base Vest and Components 1” Webbing

Item	Nomenclature	Computer Nomenclature	Cut
31	YIBYAB TEMPLATE	IMTV-YIBYAB TEMPLATE	1
32	FRONT POCKET PULL TAB	IMTV-FRONT PCKT PULL	1

3.3.1.10 Yoke and Collar Shell

Item	Nomenclature	Computer Nomenclature	Cut
1	UNDR COLLAR OUTER SHELL	YOKE-UND CLR OUT SHL	2
2	YOKE BOTTOM SHELL	YOKE-YOKE BTTM SHELL	1
3	YOKE TOP SHELL	YOKE-YOKE TOP SHELL	1

3.3.1.11 Yoke and Collar Ballistic Filler

Item	Nomenclature	Computer Nomenclature	Cut
4	YOKE BALLISTIC FILLER	YOKE-YOKE BALLISTIC	x
5	BALLSTIC COLLAR WIDE	YOKE-COLLAR WIDE	x
6	BALLSTIC COLLAR NARROW	YOKE-COLLAR NARROW	x

3.3.1.12 Yoke and Collar Inner Lining

Item	Nomenclature	Computer Nomenclature	Cut
7	TOP CLLR OUTER SHELL	YOKE-TOP CLR INN SHL	2

3.3.1.13 Yoke and Collar 1" Webbing

Item	Nomenclature	Computer Nomenclature	Cut
8	YOKE WEBBING	YOKE-YOKE WEBBING	2

3.3.1.14 Groin Outer Shell

Item	Nomenclature	Computer Nomenclature	Cut
1	OUTER SHELL	IMTV-GROIN OUTR SHLL	2

3.3.1.15 Groin Ballistic Filler

Item	Nomenclature	Computer Nomenclature	Cut
2	GROIN BALLISTIC	IMTV-GROIN BALLISTIC	x

3.3.1.16 Base Groin and Components Ballistic Panel Cover

Item	Nomenclature	Computer Nomenclature	Cut
3	GROIN BALLISTC COVER	GROIN BALLISTC COVER	2

3.3.1.17 Groin 1" Webbing

Item	Nomenclature	Computer Nomenclature	Cut
4	GROIN HOLDER	IMTV-GROIN HOLDER	2

3.3.1.18 Lower Back Protector Outer Shell

Item	Nomenclature	Computer Nomenclature	Cut
1	OUTER SHELL	KIDNEY-OUTER SHELL	1
2	INNER SHELL UPPER	KIDNEY-INN SHL UPP	1
3	NNER SHELL LOWER	KIDNEY-NN SH LWR	1

3.3.1.19 Lower Back Protector Ballistic Filler

Item	Nomenclature	Computer Nomenclature	Cut
4	BALLISTIC INSERT	KIDNEY-BALLISTICS	x

3.3.1.20 Lower Back Protector Ballistic Panel Cover

Item	Nomenclature	Computer Nomenclature	Cut
5	BALLISTIC COVER INNR	KIDNEY-BLL CVR INN	1
6	BALLISTIC COVER OUTR	KIDNEY-BLL CVR OUT	1

3.3.1.21 Throat Protector Outer Shell

Item	Nomenclature	Computer Nomenclature	Cut
1	THROAT PROTECTOR FRONT	THROAT-PROTECT FRONT	2

3.3.1.22 Throat Protector Ballistic Filler

Item	Nomenclature	Computer Nomenclature	Cut
2	THROAT PROTECTOR BALLISTIC	THROAT-PROTECT BLLST	x

3.3.1.23 Throat Protector Ballistic Panel Cover

Item	Nomenclature	Computer Nomenclature	Cut
3	THROAT PROTECTOR BALLISTIC COVER	THROAT-PROT BLLS CVR	2

3.3.1.24 Throat Protector Inner Liner

Item	Nomenclature	Computer Nomenclature	Cut
4	THROAT PROTECTOR BACK	THROAT-PROTECT BACK	2

3.3.1.25 Cummerbund and Components Shell

Item	Nomenclature	Computer Nomenclature	Cut
1	OUTER SHELL	CUMMERBUND-OUTR SHLL	1
2	INNER SHELL	CUMMERBUND-INNR SHLL	1

3.3.1.26 Cummerbund and Components Plastic

Item	Nomenclature	Computer Nomenclature	Cut
3	CUMMERBUND PLASTIC	CUMMERBUND-PLASTIC	2
4	WAIST ADAPTOR PLASTIC	CUMMERBUND-ADAPTOR	2

3.3.1.27 Cummerbund and Components 3” Webbing

Item	Nomenclature	Computer Nomenclature	Cut
5	SIDE ADJUSTMENT STRAP	CUMMERBUND-ADJ STRAP	2

3.3.1.28 Side Plate Pocket and Components Shell

Item	Nomenclature	Computer Nomenclature	Cut
1	FRONT LOWER	SDPLATE-FRONT LOWER	1
2	FRONT UPPER	SDPLATE-FRT UPPER	1
3	BACK	SDPLATE-BACK	1

3.3.1.29 Side Plate Pocket Ballistic Filler

Item	Nomenclature	Computer Nomenclature	Cut
4	BALLISTIC INSERT	SDPLATE-BALLISTIC	x

3.3.1.30 Side Plate Pocket Ballistic Panel Cover

Item	Nomenclature	Computer Nomenclature	Cut
5	MIDDLE LINING	SDPLATE-MIDDLE LINNG	1

3.3.1.31 Side Plate Pocket Foam

Item	Nomenclature	Computer Nomenclature	Cut
6	FOAM	SDPLATE-FOAM	1

3.3.1.32 Side Plate Pocket 3” Elastic

Item	Nomenclature	Computer Nomenclature	Cut
7	ELASTIC HOLDER	SDPLATE-ELASTIC	1

3.3.1.33 Rifle Bolster Shell

Item	Nomenclature	Computer Nomenclature	Cut
1	RIFLE BOLSTER	RIFLE BOLSTER-SHELL	1

3.3.1.34 Rifle Bolster Hook

Item	Nomenclature	Computer Nomenclature	Cut
2	RIFLE BOLSTER HOOK	RIFLE BOLSTR-HOOK	1

3.3.1.35 Templates.

Item	Nomenclature
1	Quick Release Pull Cable
2	Shoulder Strap
3	Yib-Yab Shoulder Strap
4	Cummerbund Adapter

3.3.1.36 Fastener Tape, Hook and Loop, A-A-55126.

Item	Nomenclature	Cut
1	1" Hook	Pieces are per pattern marking
2	1 1/2" Hook	Pieces are per pattern marking
3	2" Hook	Pieces are per pattern marking
4	4" Hook	Pieces are per pattern marking
5	1" Loop	Pieces are per pattern marking
6	1 1/2" Loop	Pieces are per pattern marking
7	2" Loop	Pieces are per pattern marking
8	4" Loop	Pieces are per pattern marking

3.4 Multiple Threat Body Armor System Performance Requirements. The following requirements apply to all components and subcomponents of the multiple threat body armor system in any of its potential configurations in accordance with paragraph 3.3.

3.4.1 Functional Integration. All Body armor, multiple threat components shall be integrated for functional and physical interfaces for any Body armor, multiple threat system configuration. All components within a size shall be fully interchangeable with every other system of the same size (i.e. back ballistic panel will fit into any IMTV outer shell back of same size) with no degradation of performance. Any configuration of Body armor, multiple threat in accordance with paragraph 3.3 shall be functionally integrated with any configuration of MOLLE (see 4.4).

3.4.2 Fungus Resistance. All components and parts of the body armor, including interior components, shall be resistant to fungal growth. The visual grading shall be less than 2. All components shall show only trace or no susceptibility to fungal growth nor experience damage due to the presence of fungus spores or adjacent fungus growth. (see paragraph 4.5.8)

3.4.3 Use and Care Instruction. An instruction pamphlet will be furnished with each body armor system. The instruction pamphlet will be printed on a durable man made, synthetic paper capable of multiple time use under harsh field conditions.

3.4.4 Camouflage. Appendix A, Table III outlines the camouflage for multi terrain environment; disruptive patterns and solids, for applicable components to reduce visual and infrared (both near and far IR) signature to an acceptable level (see 4.5.9).

3.4.5 Infrared Reflectance. The infrared reflectance for finished components and subcomponents specified in 3.4.4 shall conform to the requirements specified in Appendix A,

Table IV initially and after laundering when tested as specified in 4.5.9. Acetal hardware shall conform to infrared reflectance requirements in Appendix A, Table IV.

3.4.6 Matching. The cloths shall match the standard (see 4.5.13).

3.4.7 Colorfastness. The finished cloth shall show fastness to laundering (after 3 cycles), light (after 40 standard fading hours or 170 kilojoules), and perspiration equal to or better than the standard sample or 3-4 of the AATCC Gray Scale for Color Change and Color Transfer for each of the pattern areas, except fastness to light shall be equal to or better than a rating of 3 for Color Change. The finished cloth shall show fastness to crocking equal to or better than the standard sample or shall have an AATCC Chromatic Transference Scale rating of not lower than 3-4 for all the pattern areas. The finished textile components shall meet the colorfastness requirements when tested as specified in paragraph. 4.5 (Appendix C, Table I).

3.5 Improved Modular Tactical Vest (IMTV) subsystem. See paragraph 3.3 for IMTV configuration. The minimum area of ballistic coverage for each ballistic panel subcomponent in each size is outlined in Appendix A, Table V-A when tested as specified in 4.5.5. Finished measurements for each size are outlined in Appendix A, Table V-B-H when inspected as specified in 4.5.2.

3.5.1 Ballistic Protection Levels. The Body armor, multiple threat protection levels follow (see 4.1, 4.4, & 4.6):

a) IMTV provides fragmentation protection from conventional fragmenting munitions (see paragraph 3.5.2.2).

b) IMTV provides multi-hit handgun bullet protection for 9mm, 124 gr., Full Metal Jacket (FMJ) Remington projectile (see paragraph 3.5.2.3).

c) IMTV and SAPI (see 3.7) together provide multi-hit small arms bullet protection from:
   (1) NATO 7.62 x 51 mm M80, Ball
   (2) Soviet 7.62 x 54R mm Type LPS, Ball
   (3) U.S. 5.56 x 45 mm M855, Ball

d) IMTV and ISAPI (3.7) together provide multi-hit small arms bullet protection from
   (1) NATO 7.62 x 51 mm M80, Ball
   (2) Soviet 7.62 x 54R mm Type LPS, Ball
   (3) U.S. 5.56 x 45 mm M855, Ball
   (4) 7.62 x 39 mm API (Russian BZ and Chinese Type 56)

e) IMTV and ESAPI (3.7) together provide multi-hit small arms bullet protection from
   (1) NATO 7.62 x 51 mm M80, Ball
   (2) Soviet 7.62 x 54R mm Type LPS, Ball
   (3) U.S. 5.56 x 45 mm M855, Ball
   (4) 7.62 x 63 mm M2, AP

f) IMTV and XSAPI - classified

3.5.2 Ballistic Performance. The IMTV ballistic material system consists of an outershell, ballistic panel, and an outershell inner lining to accomplish the ballistic characteristics specified in paragraphs 3.5.2.2, 3.5.2.2.1, and 3.5.2.3 as tested in paragraph 4.6.

3.5.2.1 Removable Ballistic Panel Subcomponent. Ballistic panels must be able to be inserted easily into IMTV outershell front and back base vest carriers. The ballistic panels shall provide a means to prevent raveling and soiling, and to secure placement properly within the outershell carrier. The gap/ease between outershell carrier and panel shall be no greater than the ease allowed within the baseline patterns (see 4.5.1).

3.5.2.1.1 Ballistic filler. The sample mean ballistic filler weight shall not exceed 1.10 lb / sq. ft. with a maximum 0.30 inch thickness when tested as specified in 4.5.6 and 4.5.7. Except for ancillary components such as thread, the ballistic filler shall be made entirely of ballistic material. If ballistic filler is non-contiguous, a minimum feathered overlap of 1" is required when fully extended during individual movements to maintain uniform ballistic protection.

3.5.2.1.2 Flexibility. The ballistic filler stiffness shall not exceed 225 cm-g when tested as specified in 4.6.6.

3.5.2.1.3 Abrasion Resistance. All adjacent layers within the ballistics material system shall demonstrate abrasion resistance against each other for a minimum of 2000 cycles when tested as specified in paragraph 4.5 (Appendix C, Table I). A rating ≥ 3 is required.

3.5.2.2 IMTV Fragmentation Protection. The ballistic material system (see 3.5.2) shall provide consistent ballistic performance. All IMTV components and base vest (see paragraph. 3.3) will be made from the same approved ballistic package. Appendix B, Table I lists the required minimum V50 values for base vest assembly, and collar assemblies, lower back protector, groin protector, and side plate pockets at specified obliquity when tested with the Fragment Simulating Projectile (FSP) and Right Circular Cylinder (RCC) dry and wet (sea water).

Appendix B, Table I specifies minimum ballistic performance that shall be maintained after conditioning to hot and cold temperature, accelerated aging and POL contamination. Testing is specified in 4.6. Any change in the IMTV area of coverage must meet minimum casualty reduction potential of the approved system coverage (see 3.5, Appendix A, Table V-A) and V50 performance (see Appendix B, Table I) stated herein. Any product improvements in the ballistic performance of the IMTV base vest panels shall not reduce the ballistic performance of the Body armor, multiple threat system small arms protection of base vest and SAPI when tested as specified in SAPI/ISAPI/ESAPI/XSAPI performance requirements (see 2.2).

3.5.2.2.1 Yoke Fragmentation Protection. Additional ballistic filler sandwiched in the yoke carrier of outershell and lining shall not exceed 0.40 lb./sq. ft (max.) and 0.10 inch thickness (max.). The minimum V50 is outlined in Appendix B, Table II.

3.5.2.3 Handgun Protection. The ballistic material system shall be engineered to provide handgun protection at no added weight to the fragmentation material system. Table III, in Appendix B outlines the ballistic material system minimum dry V50, and V0 acceptance for the 9mm, 124 gr., FMJ Remington projectile against 3 hits at 0 degree obliquity and 2 hits at 30 degree obliquity with maximum deformation when tested as specified in 4.6. Desired 9mm performance is required at no added material weight.

3.5.3 IMTV Construction. The exterior of the system shall be edge stitched approximately 1/8 inch from all edges EXCEPT front edge contacting the neck area of the individual and the back starting at the beginning of the shoulder flap continuing around the neck line to the other shoulder flap end. All stitching shall be back-tacked to prevent raveling and demonstrate good stitching quality with no loose ends, consistent stitches per inch, even tension with no loose needle or bobbin thread. Fabric edges shall not ravel.

3.5.3.1 Hook and Loop Fastener. Hook and loop fasteners shall not be stitched in the selvage edge to prevent associated fraying durability problems in repeated use (see 4.5).

3.5.3.2 Stitching. Stitching shall conform to ASTM D-6193, 9-10 stitches per inch. End of seams and stitches (stitch type 301) that are not caught in other seams or stitching shall be securely back tacked or back stitched. Thread breaks or bobbin run-outs occurring during sewing shall be secured by stitching back of the break minimum of 1/2 inch. Thread tension shall be maintained so that there will be no loose stitching resulting in loose bobbin or top thread, or excessively high stitching resulting in puckering of the materials sewn. Thread ends shall be trimmed to a length of not more that 1/4 inch.

3.5.3.3 Automatic Stitching. Automatic stitching machines may be used to perform any of the stitching patterns provided the requirements for the stitch pattern, stitches per inch, size and type of thread are met, and at least three or more tying, overlapping, or back stitches are used to secure the ends of the stitching.

3.5.3.4 Bartacks. No stitch run-off is allowed and no needle cutting by bartack. Double bartacks (one on top of the other) will be avoided to prevent needle cutting and weakening of the attachment point. Bartack requirements are specified in Appendix A, Table V-B when tested as specified in 4.5.

3.5.3.5 Bartack Alignment for MOLLE Pocket Attachment. The required spacing of vertical bartacks is specified below which is needed for physical compatibility of MOLLE pocket attachment on PLATE CARRIER base vest.

a) Distance between vertical bartacks on horizontal webbing shall be 1 1/2” – 0/+1/16”.

b) Distance between non-consecutive horizontal webbing shall be 1 1/8” (±1/16).

c) Vertical bartacks on consecutive horizontal webbing rows shall be vertical aligned with an offset of 3/4" 0/+1/16” bottom to top in a vertical straight line.

3.5.3.6 Buttonholes. Buttonholes shall be straight cut. Position in accordance with the marks indicated on the pattern, with the ends of the buttonholes securely tacked. All buttonholes will be 1 ¼" with a finished cut of 1"± 1/16".

3.5.3.7 Snap setting. A hole shall be prepunched to receive the button and eyelet components of the snap fastener. The hole shall be smaller than the outside diameter of the button and eyelet barrels. The fastener shall be securely clinched without cutting the adjacent materials, and no splits shall occur in the button or eyelet barrels.

3.5.3.8 Drag Strap. The drag strap on the back of the IMTV (all sizes) shall have a peak strength not less than 400 lbf (increased strength is desirable) when tested in accordance with paragraph 4.8.

3.5.3.9 Release Cable. Ends of cable to be free of burrs, sharp edges and shall have no exposed metal. Cable sleeve to be crimped to disallow movement of cable. The cable will be crimped in the cable sleeve to form a loop on one side. The loop will be 1.25" tall, as measured from the edge of the sleeve. The lengths of the cables are provided in Appendix A, Table VI. . The lengths shall be measured from the end of the cable to the closest edge of the sleeve. The crimped cable sleeve shall be contained within the handle to prevent potential snag hazards.

3.5.3.10 Snap Fastener Reinforcement. Snap reinforcement that will not ravel is required on any single fabric layer application.

3.5.3.11 Binding. All ends of binding not completely encased are to be seared.

3.5.3.12 IMTV Drainage. The IMTV shall provide a durable means to allow water in the vest to drain out quickly and easily. Grommets/Eyelets/Washers shall be securely cinched without splitting in a manner that will prevent detachment from or cutting of the adjacent material.

3.5.3.13 Torso Adjustment. Torso adjustment shall provide the wearer a means to easily secure the vest to the torso. The external adjustment located in front of the wearer, shall be a hook and loop type closure. The external adjustment, located behind the wearer, shall utilize the cummerbund adapter and adjust using the MOLLE attachments on the outside of the cummerbund. The left and right shoulder straps shall utilize friction adjustment and hook and loop type closure.

3.5.3.14 Emergency Release Mechanism. An emergency release mechanism shall be provided. The activator shall be located on the cummerbund portion of the vest and be capable of being configured to allow operation with either hand, gloved or not. Upon activation of the mechanism, the cummerbund shall separate in the back of the vest;

3.6 Size, Identification, and Instruction Label. Labels will be readable under low light conditions; moonlight and red or blue filtered flashlight. The label shall be of sufficient strength to withstand repeated abrasion during field use and cleaning, and include the following: Color: Tan. Contents of labels shall be as found in 6.6

a) The IMTV base vest component and ballistic panel subcomponent shall have a combination size, identification, serial number, and ballistic protection level and instruction label for the entire IMTV system. Chest circumference for each size in Appendix A, Table VII.

b) The side plate pockets shall have a combination identification, serial number, and ballistic protection level and instruction label for the side plate pocket.

c) The cummerbund consists of 3 sizes and is comprised of two base components that are interchangeable with one another, thus eliminating independent left and right sides. Each cummerbund base component shall have a combination size, identification, serial number and instruction label.

d) The instruction label shall include do's and don'ts for use and cleaning instructions, and donning/doffing instructions for the entire IMTV system. (See Appendix E)

e) The instruction label shall be located on the inside of the back of the base vest. The size of the label shall be 4.5 inches wide by 7.75 inches high. The type shall be no smaller than 10 point and shall be in accordance with MIL-DTL-32075, Type VI, Class 14. (See Appendix E)

f) The modular components; throat, yoke collar assembly, side plate pockets, cable assembly, lower back protector assembly, and groin protector assembly are also to be labeled. Label size shall be at the option of the contractor governed by the contents and size of the characters of the inscription, space between lines, and as applicable blank margins on the sides of the labels. The contents of the labels shall be as found in 6.6.

3.7 SAPI Pocket. The IMTV SAPI pockets shall ensure positioning of the bottom horizontal edge according to the Government patterns for proper organ coverage, and have enough ease to allow the SAPI, ISAPI, ESAPI, or the XSAPI to be easily and quickly inserted into and removed from the vest without struggle or force. The SAPI pocket shall not allow the Insert to shift during user operation or due to added weight of MOLLE components attached to the outershell. (see paragraph 4.7.1 and 4.7.2).

3.8 Responsibility for compliance. All items shall meet all requirements of section 3 and 4 of this specification. The absence of any inspection requirements shall not relieve the contractor of the responsibility of ensuring that all products of supplies submitted to the government for acceptance shall comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements; however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the government to accept defective material. If there is a conflict between the stated requirements and the ANSI standard, the more restrictive requirement shall apply.

4. VERIFICATION

4.1 Classification of Inspections. The inspection requirements specified herein are classified as outlined below. Unless otherwise specified, the contractor is responsible for the performance of all inspection requirements specified herein. The Government reserves the right to perform any of the inspections set forth where such inspections are deemed necessary to ensure the supplies conform to prescribed requirements.

a) First Article Test (see 4.2)

b) Lot Acceptance Test (see 4.3)

4.2 First Article Test. When a First Article Test is required, it shall be examined for design (3.3), compatibility and interchangeability of components, inspection requirements in 4.5, ballistic data for all test conditions 4.6.1.1, data, certificate, or compliance for testing requirements in 4.6 and 4.7, and overall workmanship (see Appendix C, Table I).

4.2.1 Material Qualification. At any point after a First Article Test has been approved, any material change must be tested in accordance with the appropriate paragraph of this Purchase Description and approved by the government.

4.2.2 Ballistic Qualification. At any point after a First Article Test has been approved, any material or process change to the ballistic package will be required to pass all ballistic First Article Test requirements as specified in paragraph 4.6.

4.3 Lot Acceptance Test. Lot Acceptance Testing shall be performed in accordance with Section 3 and 4 in conjunction with Appendices A, B, C, and D. The Government's acceptance of the contractor's end item product will be determined by the ballistic and non-ballistic requirements validation.

4.3.1 Certificate of Compliance (COC). When certificates of compliance are required, the Government reserves the right to inspect such items to determine the validity of the certification.

4.4. Demonstration Verification. The performance requirement is verified by observation and operation that the properties, characteristics and parameters of the item meet the functional requirements specified in applicable paragraphs of Section 3. Pass or fail criteria are simple accept or reject indications of functional performance since no qualitative values exist or are difficult to measure (see Appendix C, Table I).

4.5 Requirements and Verifications. Appendix C, Table I delineates performance requirements verified through visual methods, including physical measurements in order to determine that no deficiencies exist.

4.5.1 End Item Visual Inspection. The end items shall be inspected for the defects listed in Appendix C, Table II. The lot size shall be expressed in units of vests or the individual

components (when component is purchased separately). The sample unit shall be one completely fabricated vest or individual component.

4.5.2 End Item Dimensional Inspection. The end items shall be inspected for finished measurements (see Appendix C, Table III). The lot size shall be expressed in units of vests or individual components.

4.5.2.1 Linear Measurements. Front and back center measurements are taken along the center line by holding the garment taut with a metal measuring device and measurements taken to the nearest 1/16 inch. Front and back width, and webbing hanger's measurements are taken in a flat, relaxed state, with a metal measuring device and measurements taken to the nearest 1/16 inch. Dimensional measurements are taken as described below:

a) Spacing of Webbing Hangers for MOLLE pockets: The horizontal distance between bartacks shall be taken from the center of one bartack to the center of the adjacent bartack. The spacing between non-consecutive horizontal webbing shall be measured on adjacent webbings from the bottom edge of one to the top edge of the other.

b) Base Vest Center Front and Back Lengths: The center front and back length shall be taken on a straight line from the center of the back from the top edge of the base vest neckline (center front and back) to the bottom edge of the shell. Note: Front flap and/or back center flap may be raised while taking measurement.

c) Base Vest Front Width: The front width shall be taken on a straight line measuring across front panel from side to side at middle webbing of map pocket.

d) Base Vest Back Width: The back width shall be taken on a straight line measuring across back panel at middle webbing of cummerbund holder

e) Cummerbund Length and Width: The length and width shall be taken on a straight line from center edge to center edge.

f) Cummerbund Side Plate Pocket Channel: The side plate pocket channel opening measurements shall be taken on a straight line along the outer edge of the cummerbund from bartack to bartack of the channel opening for both sides of the channel.

g) Groin Protector Length: The measurement shall be taken on a straight line from top to bottom along center of the panel.

h) Groin Protector Width: The measurement shall be taken on a straight line from edge to edge across the top edge of the panel.

i) Lower Back (Kidney) Protector Length and Width: The length and width shall be taken on a straight line from center edge to center edge.

j) Yoke and Collar: Each collar length and height shall be measured. Collar height will be measured from the top center edge of the collar to the binding edge of the where the collar and base yoke join together. Each collars' length shall be measured along the binding edge where the collar and base yoke join together. The length of the back portion of the yoke shall be measured in a straight line from the binding edge where both collars intersect and join the base yoke to the center binding edge of the back of the yoke.

k) Throat Protector Length and Width: The width shall be measured at the widest point from edge to edge. The length shall be measured from edge to edge in the center of the panel.

4.5.3 In Process Inspection:

In Process Visual Examination of Cut Parts, Fillers and Patterns. The cut parts for the vest shell assembly, the ballistic filler components, and collars shall be 100 percent inspected by vendor during the cutting process to determine that parts containing defects such as a hole, cut, are removed from production. Ballistic fillers shall be 100 percent inspected by vendor during the assembly of the individual groups to assure that they contain the correct number of plies, that no individual plies are pieced and they are marked correctly as to the size and number of plies. In addition to the above, inspection shall be made of working patterns to assure that they conform to government patterns in all respects. Whenever nonconformance's are noted, correction shall be made to the item or items affected. Parts that cannot be corrected shall be removed from the production.

4.5.4 In-process Visual Examination of Ballistic Filler Assemblies for Size. Appendix C, Table IV provides visual examination criteria for ballistic filler. The lot shall be expressed in units of front and back ballistic fillers, side plate pocket ballistic fillers, groin protectors, lower back protectors, and collar assemblies.

4.5.5 Area of Coverage. Square inches of coverage are measured by digitized patterns and comparison to working patterns.

4.5.6 Weight. The IMTVs will be examined for weight by component. Weights are taken on a tared scale and measured to the nearest 0.01 pound. Areal densities for production items may be calculated by weighing the ballistic filler insert divided by the pattern area. Areal densities for First Article Test may be calculated from weights and measurements taken from shoot-packs submitted for ballistic testing. Instructions for shoot-pack measurement are outlined in Appendix D Instructions for Shoot-Pack Measurement. Units shall be expressed in lb./sq.ft.

4.5.7 Thickness. Thickness is measured to the nearest 0.01 inch when measured under 0.5 psi when tested according to ASTM D-1777.

4.5.8 Fungus Test. Verification of compliance with the fungus requirement will be performed through the use of certified materials and coupon sampling. A fungus test will be performed on all non-certified materials. Tests will be performed in accordance with Method 508.4 of MIL-

STD-810. A sample of each non-certified material will be placed in the fungus test chamber for 28 days.

4.5.9 Infrared Reflectance. Spectral reflectance shall be evaluated initially and after laundering in accordance with Appendix A, Table IV. The accelerated laundering shall be performed using AATCC 61 Opt #A except; a 4 gram sample size shall be used. When evaluating the camouflage printed cloth, each color shall be tested separately. (Note: A sample size large enough to evaluate spectral reflectance shall be used. Ten (10) stainless spheres and 1993 AATCC Standard Reference Detergent without optical brightener shall be used. Spectral reflectance, initially and after laundering, will be obtained from 600 to 860 nanometers (nm), at twenty (20) nm intervals on an integrating sphere spectrophotometer or a spectroradiometer. The calibration of the instrument shall be traceable to the National Institute of Standards and Technology Perfect Reflecting Diffuser Calibration as stated in a Certificate of Traceability supplied by the instrument calibration standards. The spectral bandwidth shall be less than 26 nm at 860 nm. Reflectance measurements may be made by either the monochromatic or polychromatic mode of operation. When the polychromatic mode is used, the spectrophometer shall operate with the specimen diffusely illuminated with the full emission of a source that simulates either CIE Source A or CIE Source D65. Measurements will be taken on a minimum of 2 different areas and the data averaged. The specimen shall be viewed at an angle no greater than 10 degree from normal, with the specula component included. Photometric accuracy of the spectrophotometer shall be within 1 percent, and wavelength accuracy within 2 nm. The standard aperture size used in the color measurement device shall be 1.0 to 1.25 inches in diameter. When the measured reflectance values for any color at four or more wavelengths do not meet the limits specified in Appendix A, Table IV, it shall constitute a test failure.

4.5.10 Accelerated Laundering Test. The test procedure shall be as follows using the equipment cited in AATCC 61. Cut five specimens containing predominantly black print, each 4.5” by 3.0 inches, from the basic material and then fold in half, with the face side out, to form a 2.25” x 3.0” dimension. Machine stitch the open edges together (seam allowance of no more than 0.25”) to form a bag leaving an opening approximately 1.0” in length. Through the opening, add 35 stainless steel spheres. Close the bag by stapling or stitching. Place the bag in a stainless steel cylinder (one bag per cylinder) without the color transfer cloth; add 50 ml of type II P-D-245 detergent solution (0.5 percent by weight detergent solution) and 100 stainless steel spheres and close tightly. Place the stainless steel cylinder in a preheated Launder-Ometer set at a water bath temperature of 160 +/- 5 degree F. Agitate the cylinder for one (1) hour maintaining a constant temperature. At the end of the laundering cycle, remove the bag from the cylinder and rinse thoroughly in a beaker or in running tap water at 100 +/- 5 degree F for five (5) minutes with occasional stirring or hand squeezing. Remove excess water by squeezing in hand (not extracting) and than dry bag in automatic dryer set on permanent press cycle, 150 – 160 degree F for fifteen minutes (more than one bag can be dried together). If the bag breaks open to release the contained spheres at any time during the test, the test shall be considered invalid and another bag specimen shall be prepared and tested. Remove all spheres from the bag and evaluate each face of the bag without pressing or ironing the bag. Each face of the laundered bag shall be compared to the original sample (unlaundered) in accordance with AATCC evaluation procedure 1 for evaluation of Gray Scale for color change, and the rating shall be based on the portion of the black print exhibiting the most color loss. The lower of the two ratings of each bag shall be

recorded as the result for the bag. Failure of any of the five bags to meet required rating shall be considered a test failure.

4.5.11 Resistance to POL, insect repellent, sweat, and sea water after one laundering. IMTV outershell carrier cloths shall be tested, after one laundering per 4.5.10, and after exposure to each DEET, POLs; motor oil, gasoline and weapon lubricant, sweat, and sea water for hydrostatic resistance in accordance with AATCC TM 127. A specimen for each test liquid (i.e., DEET, motor oil, etc) shall be 8 inches by 8 inches. The specimen shall be laid flat, face side up, on a glass plate, 8 inches by 8 inches by ¼ inch and three drops of each test liquid shall be applied to the center of the specimen. A glass plate the same dimensions shall be placed on the specimen and a four pound weight placed in the center of the glass plate assembly. After 16 hours, remove the specimen and test immediately for hydrostatic resistance. DEET test liquid shall be diethyltoluamide (O-I-503 Type II, Concentration A). The motor oil shall conform to ASTM D-4485, Grade CD-II. The weapon lubricant shall conform to MIL-PRF-63460 or commercial Break Free CLP, Santa Ana, CA or equal. The perspiration solution shall be made up in a 500 ml glass beaker by combining 3.0 grams sodium chloride, 1.0 gram of trypticase soy broth powder, 1.0 gram normal propyl propionate, and 0.5 gram liquid lecithin. Add 500 ml of distilled water, add a magnetic stirring bar, and cover the beaker. Place the beaker on a combination hot plate/magnetic stirrer apparatus. While stirring, heat the solution to 50 degree C until all ingredients are dissolved. While stirring, cool the solution to 35 degree C, remove cover, and dispense immediately with pipette or other suitable measuring device. Dispense 2 ml of perspiration solution at 35 degree C onto the center of an 8 inch by 8 inch by 1/4 inch glass plate. Place an 8 inches by 8 inches specimen face up. Dispense an additional 2 ml of perspiration solution onto the center of the specimen. A glass plate (do not rinse) of the same dimensions shall be placed on the specimen and a four pound weight placed in the center of the glass plate assembly. After 16 hours, remove and air dry specimen before testing for hydrostatic distance. See 4.6.1.1.1 for sea water formulation and sample preparation shall be the same as perspiration.

4.5.12 Laundering Procedure. The test specimens and ballast, if needed, shall be placed in an automatic washing machine set on permanent press cycle, high water level and warm (105 degree F +/- 5 degree F) wash temperature. The test specimens shall be taken from the vicinity of the fabric as the specimens for the initial test. 0.5 ounce (14 grams) of 1993 AATCC Standard Reference Detergent. The duration of the laundering cycle shall be 30 +/-5 minutes. After laundering, the specimens and ballast shall be dried in an automatic tumble dryer set on permanent press cycle, 150 to 160 degree F for approximately 15 minutes. The laundering equipment, washer and dryer, shall be in accordance with AATCC TM 135-1992.

4.5.13 Matching. The IMTVs individual components, assemblies, cloths and webbing shall match each other when assembled into a complete system as well as match the standard samples viewed under filtered tungsten lamps that approximate artificial daylight and that have a correlated color temperature of 7500 +/- 200 K, with illumination of 100 +/-20 foot candles, and shall be a good match to the standard sample under incandescent lamplight at 2300 +/- 200K.

4.5.14 Ballistic Filler Abrasion Resistance. Testing shall be performed in accordance with ASTM D-3886 with the following exceptions: When a woven material is part of the ballistic

layer system, it shall be used as the abradant mounted on the surface abrasion head; both the face and back of the test specimen shall be evaluated; the diaphragm shall be inflated to 4.0 psi with a 5.0 lb load. The abraded specimen shall be visually examined and rated according to the following criteria.

1. Severe change in surface appearance with most or all fibers in the center of the abrasion area being worn off or broken.
2. Moderate change in surface appearance with significant breakage of fibers in the center of the abrasion area and no appearance of a hole.
3. Slight change in surface appearance and minimal fiber breakage
4. No fabric structure change.

4.6 Ballistic Performance. First Article Testing will be conducted on 15 x 15 inch shoot packs of the proposed ballistic material system. Lot Acceptance Testing will be conducted on the end item constructed of the approved ballistic material system (see 6.4). Failure to meet the requirements of any sub-test will constitute failure for the entire First Article Test or Lot Acceptance Test.

4.6.1 Ballistic Testing. General procedures and requirements are provided in 4.6.2 (see 6.5 for definitions).

4.6.1.1 Conditions. Dry specimens and specimens after; wet, hot temperature, cold temperature, accelerated aging and POL conditioning will be ballistically tested as specified in 3.5.2.2. Dry condition is the standard test condition specified in 4.6.2.3.

4.6.1.1.1 Wet Condition. Sea water shall be utilized for wet test conditions. Sea water formulation is 3% sodium chloride/0.5% magnesium chloride. The wet condition is achieved by completely submerging the IMTV system in sea water at 70 +/- 5 degree F for 24 hours. The specimens are submerged such that the fluid is in contact with all exterior surfaces to allow maximum fluid penetration. A ten pound weight shall be placed on a 15" x 15" plate to distribute load to allow for maximum fluid penetration. Excessive water will be drained from the specimen by hanging vertically for 15 minutes and tested within 5 minutes with tests completed within 60 minutes.

4.6.1.1.2 Temperature Extremes Condition. For hot temperature extreme, the IMTV system shall be heated in an oven operating at 155 + 10 degrees Fahrenheit for 6 +/- ¼ hours continuously. The test specimen shall be removed from the oven, mounted and ballistically tested as specified in 4.6.3. For cold temperature extreme, the test specimen shall be cold temperature exposed to -60 +/-10 degree F for 6 +/- ¼ hours continuously. The test specimen shall be removed from refrigeration, mounted and ballistically tested as specified in 4.6.3 within 5 minutes with tests completed within 60 minutes. If the test is not completed within 60 minutes the specimen shall be reconditioned for at least 1 hour at the temperature specified above.

4.6.1.1.3 Accelerated Aging. Accelerated aging for the IMTV and/or subcomponents will be performed in general accordance with ASTM D1149, with the following modifications. The entire IMTV or subcomponent under test will be subjected to treatment. A 30 lbs. weight will be applied to the test item during accelerated aging conditioning. All tested components will be

conditioned for 72 hours at 40°C while maintaining a minimum of 50 parts per hundred million of ozone. The IMTV and/or subcomponents do not require any additional tensile strain during accelerated aging conditioning. After accelerated aging conditioning, the IMTV and/or subcomponents under test must remain at ambient atmospheric conditions for 24 hours prior to ballistic testing. Verify that the conditioned specimens perform as specified in 3.5.2.2.

4.6.1.1.4 POL Contamination. The ballistic material system specimens shall be immersed in each of the following; motor oil, and gasoline at room temperature. The specimens shall be placed flat in a pan with 1/8" – ¼" of the POL fluid. A ten pound weight shall be placed on a 15" x 15" plate to distribute load to allow for maximum fluid penetration. The loaded specimen shall remain immersed for 4 hours at room condition. The specimen shall be hung vertically to drip dry for 15 minutes, excess oil shall be wiped from the surface to facilitate handling of the specimen. The specimen shall be ballistically tested within 30 minutes with testing completed within 60 minutes. If the testing is not completed within 60 minutes another specimen shall be conditioned as specified above and the testing shall continue with the second panel.

4.6.2 Ballistic Test Criteria. For all Protection Ballistic Limits (BL); V50, Vs/Vr, and V0 acceptance tests the following minimum information is required by the government to validate performance;

a) Armor specimen description including exact materials, thickness, and areal density of armor system or ballistic system nomenclature, and sizes and weights of all components.
b) Conditioning of armor specimen.
c) Test projectile with exact nomenclature.
d) Temperature and humidity measurements.
e) Yaw angle.
f) Angles of target obliquity.
g) Velocity measurements of each test shot used to test the armor (regardless of whether that particular velocity was used in the V50 or V0 determination).
h) Velocity loss and/or corrected striking/residual velocity for fragment simulating projectiles.
i) PP (Partial Penetration) and CP (Complete Penetration) next to each shot velocity as determined.
j) Angle of spall/debris ejection if applicable.
k) Name of company performing tests.
l) Type of gun barrel, caliber, and propellant used
m) Range measurements including distances from gun barrel to velocity measurement devices and target.
m) Calculated Ballistic Limit. In a situation where the V50 BL, Vs/Vr or V0 data sheet would compromise the Security Classification Guide for Armor Materials (see 2.2), the data sheet should exclude the specific projectile used during testing.

4.6.2.1 Projectile Velocity Determination. Projectile velocity measurement methods shall employ either high velocity lumiline screens or electrical contact screens which either open or close an electric circuit by passage of the projectile through the detector. Contact screens may consist of metallic foils separated by a thin insulating layer, or may consist of a circuit printed on paper with the circuit spacing such that the projectile passing through the screen will break the

circuit. An electric counter type chronograph measuring to the nearest microsecond or as a minimum to the nearest 10 microseconds will be used with these measuring devices. As an alternative, radiographic equipment calibrated to capture the projectile at various time intervals of flight can be used. For fragment simulating projectiles, velocity correction methodology shall be used to calculate the actual striking velocity and, where appropriate, actual residual velocity.

4.6.2.2 Weapon Mounting Configuration. The spacing from the weapon muzzle to the first pair of triggering devices shall be sufficient to prevent damage from muzzle blast and obstruction from smoke in case optical devices are used. Recommended distances can be found in USATECOM TOP 4-2-805. Spacing between triggering devices is a function of the expected velocity of the projectile being fired. In many instances, physical restriction, such as short overall distance from muzzle to test sample dictates the spacing of the triggering devices. The last pair of triggering devices shall be placed at least four (4) feet (122 cm) in front of the test sample and should be protected from possible damage resulting from fragments.

4.6.2.3 Environmental Test Conditions. All ballistic tests shall be performed as closely as possible to a standard atmosphere of 68 +/- 10 degree Fahrenheit and 50 +/- 20% relatively humidity. Temperature and humidity measurements shall be recorded before the beginning of days test firings and every two hours thereafter

4.6.2.4 Projectile Yaw Determination. Projectile yaw shall be measured for each firing by yaw cards, flash radiograph or photography. Any round for which yaw is determined to be greater than 5 degrees shall be disregarded in the calculation of the ballistic limit. The measurement system employed should be capable of measuring yaw within an accuracy of 1.0 degrees.

4.6.3 V50 BL Calculation. V50 will be determined in accordance with MIL-STD-662F. For Lot Acceptance Testing, three (3) Partial Penetration (PP's) and three (3) Complete Penetrations (CP's) within a 125 ft/sec velocity spread or five (5) Partial Penetration (PP's) and five (5) Complete Penetrations (CP's) within a 150 ft/sec velocity spread yield the V50 BL determination that will be accepted. First Article Testing will require five (5) Partial Penetrations (PP's) and five (5) Complete Penetrations (CP's) within a 150 ft/sec velocity spread to determine V50 BL.

4.6.3.1 PP and CP Determination for V50. Complete and partial penetrations (see 6.6) will be determined based on the impressions left on an aluminum witness sheet. A 0.020 in. (0.051 mm thick 2024 T3 sheet of aluminum) will be placed 6 + 1/2 in. (152 + 12.7 mm) behind and parallel to the target. The aluminum witness sheet will be at least 15 x 15 in. size and be of sufficient size to capture all fragments resulting from the ballistic event, mounted rigidly around its parameter and placed so that the target impact location is approximately at the center of the aluminum sheet. The following test conditions apply:

a) Test samples should be 15.0 x 15.0 inch square size panels and configured in the proposed final armor material system for the First Article Testing Only (see 6.4).
b) IMTV Vest panels configured in the armor material system approved under the First Article Test shall be used for Lot Acceptance Testing.

c) For all size test panels a metallic (approx. 0.20 inch thick aluminum or steel) frame with minimum 1.4 inch webbing shall be employed to restrain the test material during ballistic impact.
d) The test panel will be sandwiched between 2 frames and restrained with mechanical or pneumatic clamping devices at each of the four corners of the frame.
e) The restraining frames will be cut so that a ballistic window with minimum sizing of 12.0 x 12.0 inch square will be used.
f) Shot spacing shall be based on impact point.
g) All shots shall be at least 2.5 inches from any edge of the samples.
h) Test shots shall be sufficiently spaced so that sequential shots are not influenced by previous impact areas. A minimum shot spacing of 2.5 inch is required but 3.0 inch is recommended especially when testing against handgun projectiles.
i) Depending on the test panel size it may be necessary to use 2-3 panels for the V50 determination.
j) Test specimens shall be reconditioned to a smooth shape after every shot.

4.6.3.2 Vs/Vr and V50 Test Sample Mounting. Restraint is required during testing so that the material is not pulled through the ballistic test window frame. Unless otherwise stated the following conditions shall be performed during V50 testing. The armor test sample shall be secured on the test target mount with the impact side at the appropriate angle to the line-of-flight of the projectile. The frame supports, clamps or mounting fixtures must be capable of retaining the sample and withstanding shock resulting from ballistic impact by the test projectiles. The test sample mount shall be capable of moving the sample in the vertical and horizontal directions so that the point of impact can be located anywhere on the sample and so that appropriate degree obliquity impacts can be achieved anywhere on the sample. The test sample mount shall be capable of rotating on the vertical or horizontal axis so that various obliquity attack angles can be achieved.

4.6.4 Vs/Vr Testing. The Vs/Vr testing is for Government reference only and is done by starting at the upper end of the velocity spectrum and working down to below the V50. Starting velocities are provided in Appendix D, Table III. Testing is performed at 0 degrees and 45 degrees obliquity for all RCC fragmentation projectiles. Both the striking velocity (Vs) and the residual velocity (Vr) of the projectile must be measured. Yaw of the striking projectile should be measured for all shots. Approximate starting velocities are listed below. From the starting velocity subsequent shots are taken at approximately 400 - 500 ft/sec increments down to below the V50 where there are no longer any complete penetrations. Additional shots are then taken above and below the V50, in a similar manner to standard V50 test methodology, to characterize the performance of the armor system in this area. This testing will require between 15 and 20 valid shots for each size RCC. Approximately half of the shots should be in the regime between the starting velocity and just above the V50. Shots that would not be considered valid include: excessive yaw of the striking projectile; incomplete measurement of the residual velocity of a complete penetration; impacts at incorrect obliquity; or impact closer than 1 inch to any previous impact.

4.6.5 V0 Determination for Acceptance. For V0 or full protection (no complete penetrations), a minimum velocity (muzzle plus 50 ft/sec) will be the requirement. The following conditions

apply; No complete penetration at the maximum specified shot pattern specified is the minimum requirement. Closer positioning of shots without complete penetration is a desired requirement.

a) Test samples should be 15.0 x 15.0 inch square size panels and configured in the proposed final armor material system for the First Article Testing Only (see 6.4).
b) IMTV Vest panels configured in the armor material system approved under the First Article Test shall be used for Lot Acceptance Testing.
c) Samples will be mounted on clay block described below (see 4.6.5.2).
d) The first shot will be 2.75 ± 1/4" inch from any edge.
e) The next shot shall be located 3.5 inch –0/+1/2" from the first shot and at the weakness point in the configuration, e.g.; seamed area or non-uniform area of design.
f) The third shot location should be positioned 3.5 inch –0/+1/2" from any of the 2 previous test shots.
g) The fourth and fifth shots shall be located 3.5 inch –0/+1/2" from any previous test shots and tested at 30 degrees obliquity.
h) The transient deformation shall be measured (see 4.6.5.1) after the third and fifth test firings
i) Test shots should be staggered at least 0.25 inch off the horizontal and vertical lines of any previous shots.
j) Test specimens shall be reconditioned to a smooth shape after every shot.

4.6.5.1 Back Face Deformation (BFD) Measurement. The back of the armor test specimen will be attached to a block of non-hardening, oil-based molding clay so that no movement of the test samples occur before, during or after the ballistic impact. The test fixture containing the clay backing material shall be in the form of a single block at least 4.0 in. thick and 24 x 24 in. length and height. The clay backing material shall be conditioned in its fixture, using a heated chamber or enclosure. Conditioning time, temperature, and corresponding drop test performance may change as a function of backing material age and usage. Actual conditioning temperature and recover time between uses will be determined by drop test results. Additional clay, conditioned to the same initial temperature as the fixture, shall be used to fill voids and restore the front surface of the backing material as needed. The clay consistency should be such that depression of 25mm (± 3 mm) in depth is obtained when a 1 kg (± 10gm) (2.2 lb ± 0.35 oz) cylindrical steel mass, 44.5mm (± 0.5 mm) (1.75 ± 0.02 in) in diameter and having a hemispherical striking end is dropped from a height of 2 m (± 2 cm) (6.56 ft ± 0.07 ft) onto one of its square faces. The specimen will be strapped or taped to the surface of the clay material. Ballistic testing will be performed at 0 degrees obliquity and 30 degree obliquity. Back-face deformations in the clay will not exceed 44 mm. when measured from the original undisturbed surface of the backing material to the lowest point of the depression. There are two acceptable methodologies to deriving the Back Face Deformation.

Methodology 1 - All Back Face Deformation measurements will only be conducted at 0-degree obliquity to the original undistributed surface of the backing material. Indentation measurements will utilize measurement devices (+/- 0.1 mm accuracy) incorporating a fixed reference "guide" (see Figure xx) that can rest solidly upon two edges of the fixture, establishing the reference plane across the diameter of the indentation. The distance between the reference "guide" and original undisturbed surface will be measured at the point of intended impact prior to impact.

The distance between the reference "guide" and the lowest point of depression will be measured after impact. Back Face Deformation will be the difference between the two measurements.

Methodology 2 - Back Face Deformation measurements will be taken utilizing a certified, calibrated laser scanner measurement instrument, which provide a means to accurately measure the difference between the original undisturbed clay surface and the deepest point of BFD signature. The perpendicular distance between the original surface and the deepest point of depression, with reference to the original undisturbed surface, will be measured after the test record shot impact. The laser scanner measurement instruments shall be certified by ATEC and use a software package capable of meeting the following requirements:

- Uniform sample: 0.5mm
- Noise reduction: Data with 0.05mm limit on point movements.
- Wrap data points with polygonal surface *(w/o noise reduction).*
- Data Smoothing: Fill holes *(curvature based hole filling.)*
- Removal of intersecting triangles.
- Spike removal: 10% *(run 2 times in a row)*
- 3D: Comparison to determine the deepest point.

The software package shall ensure the deepest point is not located within a crack in the clay. If a crack in the clay is determined to be the deepest point, the software smoothing function will fill-in the crack and find the actual deepest point. The software shall also ensure that the area identified as the deepest point is has a minimum area of at least 0.7 mm x 0.7mm in width and length.

4.6.5.2 Test Sample Mounting. The molding clay block shall be rigidly held by a suitable (metal) stand. The armor test sample must remain coplanar throughout the test and shall be secured in the vertical position, perpendicular to the projectile line of flight. The frame supports must be capable of retaining the sample and withstanding shock resulting from ballistic impact. The test sample mounting shall be capable of adjustment for moving the sample in the vertical or horizontal positions so that the point of impact can be located anywhere on the sample and rotation on the vertical axis so that 0 and 30 degree obliquity impacts can be achieved anywhere on the sample.

4.6.6 Flexibility. The ballistic filler fabric subcomponents of the system shall be tested in accordance with ASTM D 1388, Standard Test Method for Stiffness of Fabrics, with the following noted exceptions, to determine the flexural rigidity in units of cm-g for each component. The restriction of size of sample may be waived such that end item ballistic filler fabric subcomponents may be tested. These results are then used to calculate an overall system flexibility as follows:

$$System\ Stiffness = \sum_{Components} [(Gi, warp + Gi, fill) / 2] \times Layers i$$

Where:

i = different fabric components in the system

$G_{i,warp}$ = Flexural Rigidity in the warp direction (cm-g)

$^{G}i,fill$ = Flexural Rigidity in the fill direction (cm-g)
$^{Layers}i$ = Number of total layers of the component system

The System stiffness shall be less than 225 cm-g when calculated as above.
Example Calculation:

A system is composed of 12 plies of material a and 6 plies of material b. Component flexural rigidities are as follows:

Material A:	Material B
G_A,warp = 4.000 cm-g	G_B,warp = 7.000 cm-g
G_A,fill = 6.000 cm-g	G_B,warp = 8.000 cm-g

System stiffness = [(4.000+6.000)/2 X 12] + [(7.000+8.000)/2 X 6] = 105.000 cm-g

The calculated system stiffness is less than 225cm-g and is therefore acceptable.

4.7 Operating Requirements Verification. Complete each verification in this paragraph.

4.7.1 Insertion Demonstration. One barehanded person shall demonstrate insertion of the ESAPI into the IMTV base vest front and back pockets as well as the insertion of the Enhanced Side-SAPI into both side plate pockets without tools or special aids. An insertion demonstration may be performed with Mock ESAPI's conforming to drawings 2-6-0588, 2-6-0589, 2-6-0590, 2-6-0591 and 2-6-0592 and the maximum thickness requirement. The respective pocket flaps shall be closed and secured with the ESAPI or Enhance Side-SAPI. It shall be possible to insert and remove the Inserts into and out of the pocket without effort. A defect shall be scored if any Insert must be forced into or removed from the pocket, or if excessive force is needed to secure the flap.

4.7.2 Insertion Test Using Protective Hand Gear. Insert ESAPI into the IMTV pocket while separately wearing standard Army cold weather gloves (NSNs 8415-01-319-5514, Shell and 8415-01-319-9042, Glove) and chemical protective hand wear (NSN 8415-01-033-3517). Perform insertion into government furnished carrier in a maximum of 30-seconds.

4.8 Drag Strap Seam Strength. Testing shall be accomplished using a constant rate-of-extension test apparatus capable of accurately measuring loads up to 1,000 ± 2 lb. The sample (an actual vest or representative back panel only, as appropriate) shall be firmly clamped across its full width to the base of the test apparatus using a steel bar or other device capable of completely restraining the sample during testing. The clamp shall be placed parallel to, and within 0.25 in of the bottom of the drag strap (i.e., on the SAPI pocket flap). The center of the drag strap shall be directly in line with the center of the loadcell and pulling head. The drag strap shall be affixed to the load cell and pulling head through a loop of 1-in webbing (A-A-55301 Type VI) having a gage length of 12 ± 1 in. A preload of 1 lbf shall be applied prior to the start of testing. The loadcell and pulling head shall be advanced at a constant rate of 2 in./min until failure. The following minimum data shall be recorded: Extension and Load at first-stitch failure (if

applicable), Extension and Peak Load; Mode of Failure (i.e., seam failure, fabric tear-out; handle break).

5. PACKAGING

5.1 Packing. For acquisition purposes, the contract or order shall specify complete packaging requirements. When DOD personnel perform material packaging, those personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. The Inventory Control Point packaging activity within the Military Department of Defense Agency, or within the Military Department's Systems Command, maintains packaging requirements. Packaging data retrieval is available from the managing Military Department's or defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES: (This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.).

6.1 Intended Use. The multiple threat body armor is a modular body armor providing multiple levels of ballistic protection depending on the system configuration. The Improved Modular Tactical Vest (IMTV) provides protection from conventional fragmenting munitions and 9mm handgun. The area of protective coverage of the body is dictated by the number of modular components worn to extended coverage. IMTV protection is increased to protect vital organs from multiple hits against small arm rifles and indirect fire flechette when front, back and side small arms protective inserts are worn.

6.2 Acquisition Requirements. Acquisition documents should specify the following:

a) Title, and date of this document.
b) When First Article Test, and pre-production items are required.
c) Camouflage required.
d) Size Tariff
e) Contractually approved ballistic package(s) to include package name, complete description, and First Article Test acceptance letter.

6.3 Simulant/Surrogate Shoot-Pack. A Simulant/Surrogate Shoot-Pack system of IMTV body armor may be used to represent the ballistic resistant materials of the IMTV. All surrogate shoot-pack systems shall consist of (1) a base vest ballistic filler packet and (2) a ballistic filler carrier with insert pocket. A yoke shoot-pack shall additionally include (3) a yoke ballistic filler packet.

The ballistic filler packet for IMTV base vest will be 15 x 15 inches in size consisting of X plies of the proposed ballistic material system used in IMTV base vest (see 3.3.1.7 and 3.5.2.1.1). The ballistic packet will be stitched diagonally across the 4 corners with a 5-inch line of 50 TEX Aramid thread at 5 to 10 stitches per inch. When the ballistic filler is an asymmetric system of different materials, the filler packet will be labeled to clearly indicate the strike face from the back face.

The ballistic filler packet for IMTV yoke will be 15 x 15 inches in size consisting of X plies of the proposed ballistic material system used in IMTV yoke (see 3.3.1.11 and 3.5.2.2.1). The ballistic packet will be stitched diagonally across the 4 corners with a 5-inch line of 50 TEX Aramid thread at 5 to 10 stitches per inch. When the ballistic filler is an asymmetric system of different materials, the filler packet will be labeled to clearly indicate the strike face from the back face.

The ballistic filler carrier will have an Insert pocket capable of holding the largest Insert stitched on the face fabric. The pocket cover shall consist of the same front outer shell fabric used in the construction of the IMTV base vest. The face fabric of the ballistic filler carrier shall consist of the same top plate pocket fabric used in the construction of the IMTV base vest plate pocket. The insert pocket will be stitched on three sides to the face fabric with nylon or polyester thread. The top edge of the pocket will have a minimum of 5 inches of not less than 0.5 inch wide hook and loop fastener centered and stitched at the top. The ballistic filler carrier back cover shall consist of the same front inner shell fabric used in the construction on the IMTV inner shell. The face fabric and back cover of the ballistic filler carrier will be stitched together on 3 sides with nylon or polyester thread to form a pocket to hold the ballistic filler packet(s). The fourth side will remain unstitched but will have a minimum of 5 inches of not less than 0.5 inch hook and loop fastener centered and stitched to the top. Each ballistic filler carrier will be individually serialized and clearly labeled to indicate the strike face.

For yoke shoot-packs, insert the yoke ballistic filler packet to the back cover of the ballistic filler carrier and have the base vest ballistic filler packet adjacent to the front of the carrier.

All surrogate shoot-pack systems shall be clearly labeled to indicate the strike face of the system.

6.4 Ballistic Testing Definitions. The following definitions are provided to assist in understanding the test procedures:

Fair Impact. All three impacts will be at 0 degrees obliquity. A projectile that impacts the armor at an angle of incidence no greater than + 5 degrees from the intended angle of incidence will be considered a fair impact.

Partial Penetration PP(P). Any fair impact that is not a complete penetration shall be considered a partial penetration.

Complete Penetration (CP) for V50 Testing. A complete penetration occurs when the impacting projectile or any fragment thereof, or any fragment of the test specimen perforates the witness plate resulting in a crack or hole which permits light passage when a 60-watt, 110-volt bulb is placed behind the witness plate.

Complete Penetration (CP) for Acceptance Testing. A complete penetration will have occurred when the projectile, fragment of the projectile or fragment of the armor material is imbedded or passes into the clay backing material used to measure transient deformation. Paint or fibrous materials that are emitted from the back of the test specimen and rests on the outer surface of the clay impression are not considered a complete penetration.

Residual Velocity. The velocity at which a projectile exits the rear surface of an armor sample. Used only for Vs/Vr testing.

Areal Density (AD). A measure of the weight of the armor per unit area, usually expressed in pounds per square foot (lb. /ft 2) or kilograms per square meter (kg/m 2) of surface area.

Obliquity. A measure, normally in degrees, of the extent to which the impact of a projectile on an armor material deviates from a line normal to the target. Thus, a projectile fired perpendicular to an armor surface at 0 degrees obliquity.

Spall. The detachment or delamination of a layer of material or the ejection of projectile/armor material in the area surrounding the location of impact, which occurs on the front of the armor surface. Spalling may be a threat mechanism even when penetration of the armor itself is not complete.

Yaw. Projectile yaw is the angular deviation of the longitudinal axis of the projectile from the line of flight at a point as close to the impact point on the target as is practical to measure.

V50 Ballistic Limit (BL). In general, the velocity at which the probability of penetration of an armor material is 50 percent.

6.5 Contents of Labels, and Use and Care Instructions: see Appendix E.

APPENDIX A – MATERIAL PROPERTIES FOR IMTV SUBCOMPONENTS

Table I. Cloths: Base Vest and Components Outer and Inner Shell (see 3.2.1)

Characteristic	Outer Shell Cloth*	Inner Shell Cloth**
Weight (oz/yd2) (max.)	12.0	8.0
Breaking Strength; lb. (min.) Warp X Filling	 500x300	 360 X 270
Dimensional Stability; % (max.) Warp X Filling	 3.0 x 2.0	 3.0 X 2.0
Abrasion Resistance: (min.) Number of Cycles	 1000	 1000
Water Repellency: Spray Rating (min) Initially After 1 Laundering	 100,100,90 90,80,80	 100,100,90 90,80,80
Hydrostatic Resistance: cm (min) Initially and After 1 Laundering After 1 Laundering and POL Contamination After 1 Laundering and Insect Repellent Contamination After 1 Laundering and Sweat Contamination After Laundering and Sea Water Contamination	 35	 35
Dynamic Absorption: % (max.) After 1 Laundering	 20	 20
Resistance to Organic Liquids (min) After 1 Laundering	No wetting by n-dodecane	No wetting by n-dodecane

*3.3.1.1, 3.3.1.25
** 3.3.1.2, 3.3.1.10, 3.3.1.14, 3.3.1.18, 3.3.1.21, 3.3.1.28, 3.3.1.33

Table II. Foam Characteristics (see 3.2.7)

Characteristic	Requirement
Density Thickness	3.1 lb/cu ft 0.25 in
Compression Strength @ 25% deflection @ 50% deflection	 6 psi 15 psi
Elongation at Break Tear Resistance Water Absorption of Surface	220% 19 lbf/in 0.04 lb/sq ft (max)

Table III. Camouflage Shades (see 3.4.5)

COMPONENT(S) OR PART(S)	**Color**
(1) Outer and Outer Shell: Base Vest Cummerbund Yoke and Collar Side Plate Pockets Lower Back Protector Groin Protector Rifle Bolster	Coyote 498
(2) Ballistic Panel Cover MiL-DTL-508	Tan 380
(3) Webbing Binding Tape Hook & Loop Fastener Thread Elastic Webbing Labels	Coyote 498
(4) Hardware Buckles Snaps	 Coyote 498 Black

Table IV. Infrared Reflectance Requirements (percent) Coyote 498 (see 3.4.6)

Wavelengths Nanometers (nm)	**Min**	**Max**
600	8	20
620	8	20
640	8	22
660	8	24
680	12	24
700	12	34
720	16	42
740	22	46
760	30	50
780	34	54
800	36	56
820	38	58
840	38	58
860	40	60

TABLE V-A: Minimum Ballistic Panel Area; Sq. In. (see 3.5)

Ballistic Panel	X-Small	Small	Medium	Large	X-Large
Front Panel	266	283	325	368	414
Back Panel	294	314	361	410	461
Groin	69	69	69	84	84
Lower Back (Kidney)	53	53	53	53	53
Yoke	58	61	66	72	77
Collar Wide	25	26	27	29	30
Collar Narrow	15	16	17	18	19
Panel	18	18	18	18	18

TABLE V-B: Bartack (see 3.5.3.4)

Characteristic	Stress points; All cloth	Webbing hangers; Webbing + cloth
Length; in	3/8" min	3/4 " +/- 1/16"
Holding Strength: lb. (min.)	60	250

TABLE V-C Base Vest Finished Measurements; Inches* (see 3.5)

Size	Center Front Length +/- ½"	Front Width +/- ½"	Center Back Length +/- ½"	Back Width +/- ½"
X-Small	15 ½	23 ¼	16 ½	22 ¾
Small	16 ½	23 ½	17 ½	23
Medium	18 ½	24 ¼	19 ½	23 ¾
Large	20 ½	25	21 ½	24 ¼
X-Large	22 ½	25 ¾	23 ½	25

TABLE V-D: Cummerbund Finished Measurements; Inches* (see 3.5)

Size	Center Length +/- ½"	Center Width +/- ½"	Cummerbund Side Plate Pocket Channel +/- ½"
X-Small – Small	20 ½	6 5/8	12
Medium	23 ½	6 5/8	12
Large – X-Large	26 ½	6 5/8	12

TABLE V-E: Groin Protector Finished Measurements; Inches* (see 3.5)

Size	Center Length +/- ½"	Top Width +/- ½"
X-Small	12	8 ½
Small	12	8 ½
Medium	12	8 ½
Large	12	10 ½
X-Large	12	10 ½

TABLE V-F: Lower Back (Kidney) Protector Finished Measurements; Inches* (see 3.5)

Size	Center Length +/- ½"	Center Width +/- ½"
All Sizes	12 ½	6 ¼

TABLE V-G: Yoke and Collar Finished Measurements; Inches* (see 3.5)

Size	Collar Height +/- ½"	Collar Length +/- ½"	Center Back Yoke Width +/- ½"
X-Small	2	19-7/8	4
Small	2	20-1/8	4
Medium	2	20 ½	4
Large	2	20-7/8	4
X-Large	2	21 ¼	4

TABLE V-H: Throat Protector Finished Measurements; Inches* (see 3.5)

Size	Throat Length +/- ½"	Throat Height +/- ½"
All Sizes	10 ¼	3 ½

* See Paragraph. 4.5.2.1 for measurement directions.

Table VI. Release Cable (see 3.5.3.9)

Vest Size	Long Section (Inches)
X-Small to Small	27 ½
Medium	27 ½
Large to X-Large	31 ½

Table VII. Chest Circumference for Base Vest Outer Shell Label (see 3.6)

Size	Chest Circumference (Inches)
X-Small	29-33
Small	33-37
Medium	37-41
Large	41-45
X-Large	45-49

Table VIII. Waist Circumference for Cummerbund Label (see 3.6)

Size	Waist Circumference (Inches)
X-Small – Small	NA
Medium	NA
Large – X-Large	NA

APPENDIX B: BALLISTIC PROTECTION REQUIREMENTS

Table I: **Base Vest assembly, Side Plate Pockets, Groin, Collar and Lower Back Fragmentation Protection; Minimum V50** (see 3.5.2.2)

Fragment Projectile	V50 @ 0 degree DRY: ft/sec	V50 @ 0 degree WET: ft/sec	V50 @ 45 degree DRY: ft/sec
2 gr. RCC	2710	2575	2800
4 gr. RCC	2400	2300	2460
16 gr. RCC	2050	1920	2080
64 gr. RCC	1660	1610	1660
16 gr. RCC; After hot and cold temperatures, accelerated aging	2000	N/A	N/A
16 gr. RCC; After POL	1900	N/A	N/A
17 gr. FSP	1850	N/A	N/A

Table II. Yoke Area Ballistic Performance; Minimum V50 (see 3.5.2.2.1)

Fragment Projectile	V50 @ 0 degree DRY: ft/sec	V50 @ 0 degree WET: ft/sec	V50 @ 45 degree DRY: ft/sec
2 gr. RCC	3080	3000	3350
4 gr. RCC	2700	2550	2800
16 gr. RCC	2280	2150	2330
64 gr. RCC	1800	1700	1900
17 gr. FSP	2170	N/A	N/A

Table III: Handgun Ballistic Characteristics (see 3.5.2.3)

Projectile - 9mm, 124 gr., FMJ Remington	V50 @ 0 degree; ft/sec (min.)	V0 Acceptance; @ 0 & 30 degree ft/sec	Deformation; mm (max.)
Required	1525	1400 +50/-0	44
Desired	1625	1500 +50/-0	44

APPENDIX C: NON-BALLISTIC REQUIREMENTS AND VERIFICATIONS

Table I. Requirements and Verifications (see 4.5)

CHARACTERISTIC	REQUIREMENT PARAGRAPH	VERIFICATION PARAGRAPH	First Article Test	Lot Acceptance Test
Cloth Outer and Inner Shell	3.2.1	4.5	X	COC
Breaking Strength	3.2.1	ASTM D5034, G-E or G-T	X	COC
Dimensional Stability	3.2.1	AATCC 96 Option 1C, A	X	COC
Outershell and Innershell Cloth Abrasion Resistance	3.2.1	ASTM D 3884 (Footnote 1)	X	COC
Spray Rating: Initial 1 Laundering	3.2.1	AATCC 22 4.5.12 & AATCC 22	X	COC
Hydrostatic Resistance: Initial After 1 Laundering After 1 Laundering and POL Contamination After 1 Laundering and Insect Repellent After 1 Laundering and Sweat Contamination After 1 Laundering and Sea Water Contamination	3.2.1	AATCC 127 4.5.11 & AATCC 22 4.5.12 & AATCC 22	X	COC
Dynamic Absorption: After 1 Laundering	3.2.1	4.5.11 & AATCC 70	X	COC
Resistance to Organic Liquids: Initial After 1 Laundering	3.2.1	AATCC 118 4.5.11 & AATCC 118	X	COC
Cloth Collar Material	3.2.2	4.3.1	COC	COC
Cloth Ballistic Panel Cover.	3.2.3	4.3.1	COC	COC
Webbings and Tapes	3.2.4	4.3.1	COC	COC
Elastic	3.2.5	4.3.1	COC	COC
Fasteners, Hook and Loop	3.2.6	4.3.1	COC	COC
Foam	3.2.7	4.3.1	COC	COC
Snap Fasteners	3.2.8	4.3.1 & 4.5.1	X	COC

Polyethylene	3.2.9	4.3.1	COC	COC
Cable	3.2.10	4.3.1	COC	COC
Cable Sleeves	3.2.11	4.3.1	COC	COC
Thread.	3.2.12	4.3.1	COC	COC
Fabric Coated	3.2.13	4.3.1	COC	COC
Male Buckle	3.2.14	4.3.1	COC	COC
Female Repairable Buckle	3.2.15	4.3.1	COC	COC
Tension Lock	3.2.16	4.3.1	COC	COC
Loop	3.2.17	4.3.1	COC	COC
Design	3.3	4.4	X	X
Patterns	3.3.1	4.4	X	X
System Performance Requirements	3.4	4.4		
Functional Integration	3.4.1	4.4	X	X
Fungus Resistance	3.4.2	4.5.8	X	COC
Includes Use & Care Instruction	3.4.3	4.4		YES/NO
Camouflage	3.4.4	4.5.9	X	X
Infrared Reflectance	3.4.5, 3.2.4	4.5.9	X	COC
Matching	3.4.6	4.5.13	X	COC
Colorfastness to:	3.4.7	4.1		
Laundering: 3 Cycles	3.4.7	AATCC 61 OPTION IA	X	COC
Accelerated Laundering	3.4.7	4.5.10	X	COC
Light	3.4.7	AATCC 16 OPTION A or E (Exposure shall be 40 hrs or 170 kilojoules)	X	COC
Crocking	3.4.7	AATCC 8	X	COC
Frosting	3.4.7	AATCC 119; EXCEPT IT SHALL BE 300 CYCLES	X	COC
Perspiration	3.4.7	AATCC 16; EXCEPT BOTH ACID AND ALKALINE TEST SHALL BE PERFORMED	X	COC
Area of Coverage	3.5	4.5.3, 4.5.4, 4.5.5	X	COC
Finished Dimensions	3.5	4.5.2, 4.5.3, 4.5.4	X	COC

Ballistic Filler Weight & Areal Density	3.5.2.1.1	4.5.5, 4.5.6	X	COC
Removable Ballistic Panel Subcomponent	3.5.2.1	4.5.1	X	X
Ballistic Filler Thickness	3.5.2.1.1	4.5.5 & 4.5.6	X	X
Flexibility	3.5.2.1.2	4.6.6	X	COC
Ballistic Filler Abrasion Resistance	3.5.2.1.3	ASTM D-3886 4.5.15	X	COC
IMTV Construction	3.5.3	4.3.1 & 4.5.1	X	X
Hook and Loop Fastener	3.5.3.1	4.5.1	X	X
Stitching	3.5.3.2	4.5.1	X	X
Automatic Stitching	3.5.3.3	4.5.1	X	X
Bartacks	3.5.3.4	4.5.1	X	X
Bartack Alignment for MOLLE Pocket Attachment	3.5.3.5	4.5.1 & 4.5.2	X	X
Buttonholes.	3.5.3.6	4.5.1	X	X
Snap setting	3.5.3.7	4.5.1	X	X
Drag Strap	3.5.3.8	4.8	X	COC
Release Cable Dimensions	3.5.3.9	4.5.1	X	X
Snap Reinforcement	3.5.3.10	4.5.1	X	X
Binding	3.5.3.11	4.5.1	X	X
IMTV Drainage	3.5.3.12	4.5.1	X	X
Torso Adjustment	3.5.3.13	4.5.1	X	COC
Emergency Release Mechanism	3.5.3.14	4.5.1	X	X
Labels	3.6	4.5.1	X	X
SAPI Pocket	3.7	4.4	X	X

Footnotes:

1) H-18 abrasive wheel with 1000 gm load shall be used. A hole shall be defined as the wear through of one (1) warp and one (1) filling yarn at the same location.

Table II. END ITEM DEFECTS (see 4.5.1)

EXAMINE	DEFECT	CLASSIFICATION*	
		MAJOR	MINOR
Cloth	Any hole, cut, or tear.	101	
	Any abrasion marks, broken or missing yarns or multiple floats		201
	Any abrasion marks, broken or missing yarns or multiple floats		202
	Any mend, darn or patch.	102	
	Needle Chews.	103	
Webbing or Tape	Any hole, cuts, tears, or smash.	104	
	Not firmly and tightly woven, edges frayed or scalloped.	105	
	Multiple floats.		203
	Abrasion mark, slub, or broken end or pick.	106	
	Ends not fused as required.		204
Cabling	Any hole, cut or tear, incomplete securing of sleeve, impairing function.	107	
	Ends not finished as required.		205
Fastener Tape	Any hole, cut or tear, hooks flattened, broken or missing, impairing function.	108	
	Stitched in the selvage edge		206
Snap Fasteners	Any fastener not functioning properly i.e., fails to snap closed, provide a secure closure or open freely. NOTE: The fasteners shall be snapped and unsnapped twice to determine whether parts or fasteners separate freely and also affect a secure closure.	109	
	Clinched excessively tight, cutting material.	110	
	Clinched loosely, permitting either component to rotate freely or separate. NOTE: Incomplete roll of end of button or eyelet barrel is evidence of insecure clinching.	111	
	Not specified style or type.	112	
	Splits in button or eyelet		207
	Finish omitted or not as specified.		208
Seams and Stitching:			
Open Seams	½ inch or less.		209
	More than ½ inch NOTE: A seam shall be classified as an open seam when one or more stitched joining a seam are broken or when two or more consecutive skipped or runoff stitches occur.	113	

Raw Edges	More than ½ inch when securely caught in stitching. NOTE: Raw edges not securely caught in stitching shall be classified as open seams.		210
Seam & Stitch Type	Wrong seam or stitch type.	114	
Stitch Tension	Tension loose, resulting in loose bobbin or top thread.		211
	Excessively tight, resulting in puckering of material.		212
Bartacks	Any bartack omitted.	115	
	Any bartack not as specified or not in specified location.		213
	Loose stitching, incomplete or broken.		214
Stitching Ends	Not secured as specified.		215
Thread Breaks, Skipped Stitches, or Run-Offs.	Not over stitched as specified. NOTE: Thread breaks or two or more consecutive skipped or run-off stitches not over stitched shall be classified as open seams.		216
Component & Assembly	Any area of ballistic filler bunched (i.e. does not lie flat)	116	
	Any component part omitted or not as specified (unless otherwise classified herein)	117	
	Needle Chews.	118	
	Any mend, darn, patch, holes, splice or other unauthorized repair.	119	
Location Markings	Printed marking more than 1/32 inch in width or not covered by component part.		217
Label	Missing, incorrect, illegible.	120	
Shade	Individual components do not provide a good match one another and the standard	121	
Plate Pocket	Insert does not fit and cannot be secured into plate pocket	122	

*The presence of a number designates either major or minor. The value of the number is for internal inspection purposes only.

Table III. END ITEM DIMENSIONAL EXAMINATION

EXAMINE	DEFECT	CLASSIFICATION*	
		Major	**Minor**
Dimensional (overall)	Smaller than nominal dimensions less applicable minus tolerance indicated but not smaller than nominal dimensions less twice the applicable minus tolerance.	123	
	Larger than nominal dimensional and applicable plus tolerance.		218
Component and Location Dimensions	Not within specified tolerance		219
Stitch Margin or Gage	Not within specified tolerance		220
Box, Box-X and stitching	Dimensions not within specified tolerance		221
Hardware	Not spaced within specified tolerance		222

*The presence of a number designates either major or minor. The value of the number is for internal inspection purposes only.

Table IV. Visual Examination of ballistic Filler Size (see 4.5.4)

Examine	**Defect**	Classification*	
Size of Individual Ballistic Filler Assembly	A) Smaller than cutting pattern:	Major	Minor
	(1) 3/16 inch to 3/8 inch at any point around the periphery 1/ 2/		223
	(2) More than 3/8 inch at any point around the periphery 1/ 2/	124	
	(3) 1/8 inch up to 3/16 inch around entire periphery 2/		224
	(4) More than 3/16 inch around entire periphery 2/	125	
	B) larger than cutting pattern by 3/8 inch or more at any point 1/ 2/		225
	Minimum soft armor extending beyond edge of Insert is not achieved	126	

*The presence of a number designates either major or minor. The value of the number is for internal inspection purposes only.

1/ to be scored when condition exits for a length of more than 2 inches or if condition exists in several areas with an accumulated distance of 4 inches.

2/ the front filler or back filler individual components, as applicable shall be examined with the applicable cutting pattern centered on the filler components.

APPENDIX D: BALLISTIC PERFORMANCE VERIFICATION

Table I-A. Requirements and Verifications (see 4.5)

CHARACTERISTIC	REQUIREMENT PARAGRAPH	VERIFICATION PARAGRAPH	First Article Test	EVALUATED BY:
Ballistic Protection Levels	3.5.1	4.1, 4.4, & 4.6	X	
Ballistic Performance	3.5.2	4.6	X	
IMTV Fragmentation Protection	3.5.2.2	4.6	X	
Yoke Frag. Protection	3.5.2.2.1	4.6	X	
Handgun Protection	3.5.2.3	4.6	X	

Table I-B. Requirements and Verifications (see 4.5)

CHARACTERISTIC	REQUIREMENT PARAGRAPH	VERIFICATION PARAGRAPH	LOT ACCEPTANCE TESTING	EVALUATED BY:
Ballistic Protection Levels	3.5.1	4.1, 4.4, & 4.6	X	
Ballistic Performance	3.5.2	4.6	X	
IMTV Fragmentation Protection	3.5.2.2	4.6	X	
Yoke Frag. Protection	3.5.2.2.1	4.6	X	
Handgun Protection	3.5.2.3	4.6	X	

BALLISTIC FIRST ARTICLE TESTING PROTOCOL: IMTV Ballistic First Article Testing shall be conducted in accordance with the requirements of this purchase description and the following:

Instructions for Shoot-Pack Measurement

1. Remove the ballistic filler packet from the ballistic filler carrier

2. Weigh and record the ballistic filler packet separate from the ballistic filler carrier.

3. Place the ballistic filler packet on a flat unyielding surface having a straight backstop in which to press the ballistic filler packet against

4. Ensure that the ballistic filler packet is completely flat and firmly against the backstop but without creating any bulges in the packet

5. Measure the distance in *inches* from front to back in three locations; (1) one inch from right edge, (2) 7.5 inches from the right edge and (3) one inch from the left edge. Record each measurement using 1/16" resolution. NOTE: If applicable, do not include the ballistic filler packet *cover* in the measurement. Gently press against the seam to find the packet's linear edge and use this for measurement.

6. Rotate the ballistic filler packet 90 degrees clockwise and repeat step #4.

Diagram I. Shoot-Pack Measurement Set-up

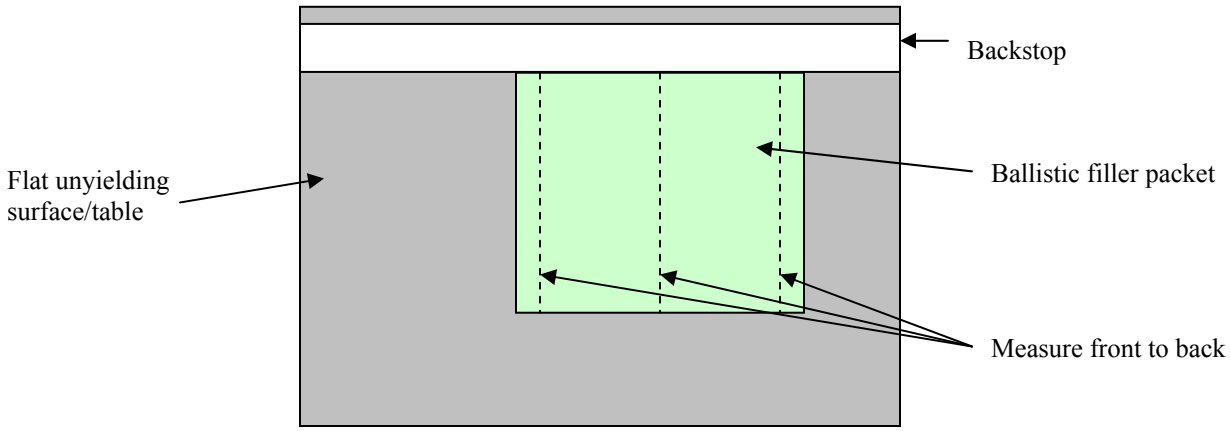


Table II. First Article Test Matrix

TEST	Frag, 2gr	Frag, 4gr	Frag, 16gr	Frag, 64gr	9mm Handgun	Need	Spec Paragraph
V50, dry, 0°	X	X	X	X		4 shoot-pack 4 yoke-pack*	3.5.2.2, 3.5.2.2.1 4.6.1
V50, wet, 0°	X	X	X	X		4 shoot-pack 4 yoke-pack*	3.5.2.2 3.5.2.2.1 4.6.1.1.1
V50, dry, 45°	X	X	X	X		8 shoot-pack 8 yoke-pack*	3.5.2.2 3.5.2.2.1
V50, high T			X			1 shoot-pack	3.5.2.2 4.6.1.1.2
V50, low T			X			1 shoot-pack	3.5.2.2 4.6.1.1.2
V50, Accelerated aging			X			1 shoot-pack	3.5.2.2 4.6.1.1.3
V50, POL oil			X			1 shoot-pack	3.5.2.2 4.6.1.1.4
V50, POL gas			X			1 shoot-pack	3.5.2.2 4.6.1.1.4
V50					X	1 shoot-pack	3.5.2.3
V0					X	1 shoot-pack	3.5.2.3
Vs/Vr, 0°	X	X	X	X		4 shoot-pack	4.6.4
Vs/Vr, 45°	X	X	X	X		8 shoot-pack	4.6.4
Contingency						8 shoot-pack 4 yoke-pack*	3.5.2.2 3.5.2.2.1
Total						43 shoot-pack 20 yoke-pack*	3.5.2.2 3.5.2.2.1

* Yoke shoot pack: Yoke ballistic material + Base Vest ballistic material to meet ballistic requirements in paragraph 3.5.2.2.1

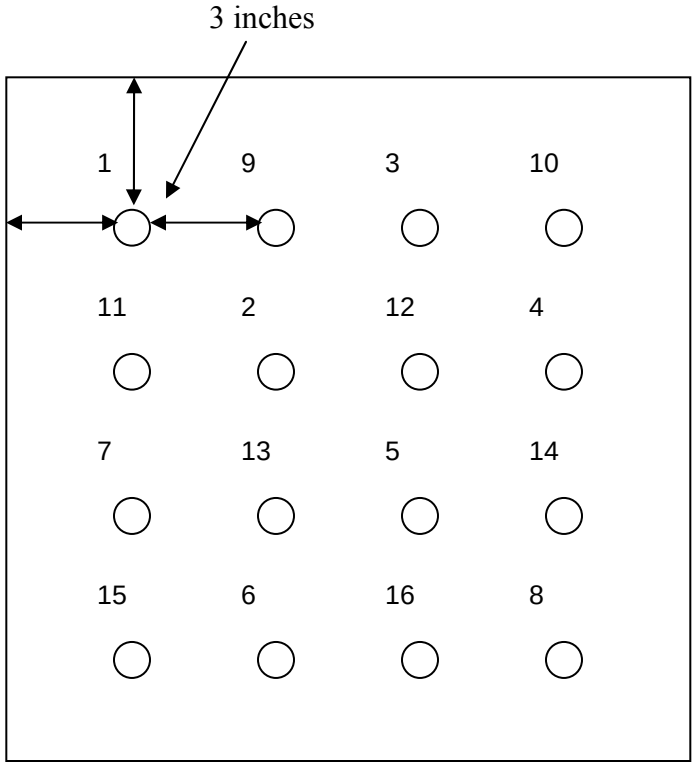
SPECIAL PROVISIONS: All production quantities submitted after approval of the First Article Test shall be produced using the same materials, processes, procedures, equipment and facilities that resulted in the manufacture of the acceptable First Article Test items. This includes all raw materials and/or sub-components. Any change in the production of the approved First Article Test items must be reported in writing to the Contracting Officer and the Contracting Officer's Technical Representative (COTR) for determination if a new First Article Test is required.

First Article Test Instruction:

For all V50, Vs/Vr, shot patterns as specified below. Starting velocity shall be approximately 100 fps above required minimum V50. Follow up & down procedure as specified in MIL-STD-662F.

Diagram II. First Article Test Shot Patterns

0 degree obliquity
16 shots



45 degree obliquity
12 shots

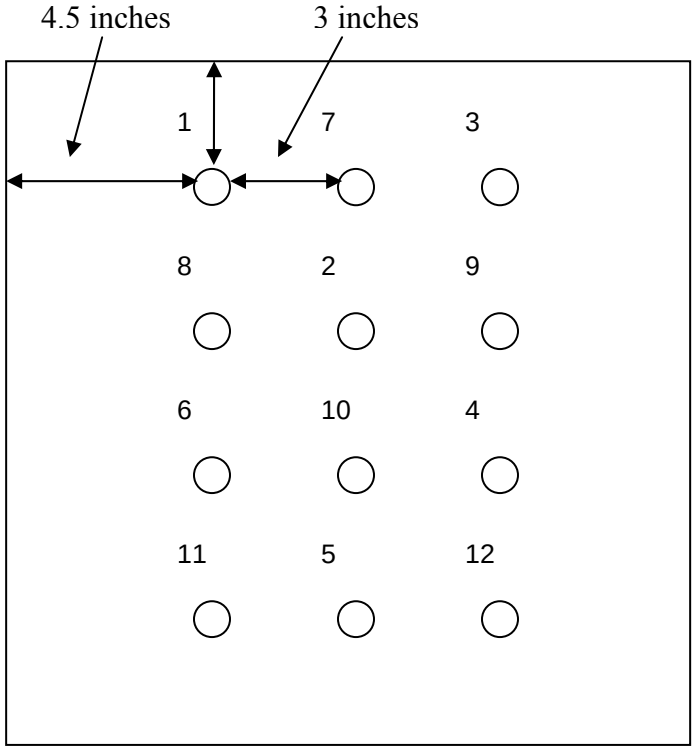


Table III. Vs/Vr starting velocity

Projectile	Starting Velocity
2- grain RCC	4900 ft/s
4- grain RCC	4900 ft/s
16-grain RCC	4600 ft/s
64-grain RCC	4000 ft/s

BALLISTIC LOT ACCEPTANCE TEST PROTOCOL: IMTV Lot Acceptance Testing shall be conducted in accordance with the requirements of this purchase description and the following:

When complete IMTVs are produced, to include front, back and components, sample shall be in accordance with Table IV-A. Ballistic Lot Acceptance Testing shall be conducted on front and back base vest panles. The panels should be rotated for different threats. For example, first IMTV sample, front panel should be tested for 17gr. V50, and the back panel should be tested for 9mm V0; the second IMTV sample, front panel should be tested for 9mm V50, the back panel should be tested for 17 gr. V50, and so on. Lot Acceptance Testing conducted on front and back base vest panels shall constitutes Lot Acceptance Testing for all components submitted with the lot, as long as those components ballistic filler were cut within the same lot of front and back base vest panels that were subject to Lot Acceptance Testing.

Table IV-A. Lot Acceptance Test Sample Selection Matrix, Base Vest

Lot	Number of test panels for threat			Requirements			Total	One vest	Total Vests
Size	V50, 17gr	V50, 9mm	V0, 9mm	V50, 17gr	V50, 9mm	V0, 9mm	Samples	Reference Test	
26 to 150	2	2	2	1850 fps min	1525 fps min	1400 + 50 fps	6	1	**4**
151 to 1200	4	4	4				12	1	**7**
1201 to 3200	6	6	6				18	1	**10**

V0 and V50 determination tested in accordance with paragraph 4.6
V50 reference testing data is for government reference only

When only IMTV components are produced (no front or back panels produced within the same spreads and markers), sampling shall be in accordance with Table IV-B. Testing shall be performed on 15 x 15 inch shootpacks cut from the same fabric spreads as the components produced.

Table IV-B. Lot Acceptance Test Sample Selection Matrix, Modular Components

Lot Size	Number of test panels for threat			Requirements			Total Samples
	V50, 17gr	V50, 9mm	V0, 9mm	V50, 17gr	V50, 9mm	V0, 9mm	
51 to 500	2	2	2	1850 fps min	1525 fps min	1400 + 50 fps	6
501 to 35,000	4	4	4				12
35.001 to 150,000	6	6	6				18

Note that if all components are not produced in the same spreads and markers (for example, different ballistic systems are used for different lots of the same material solution) then combined testing is not authorized and both Table 1 and 2 shall apply. For example, if front and back panels use X plies of one fabric, but throat, collar, groin and/or kidney use Y plies of another fabric, then each shall be tested separately.

SPECIAL PROVISIONS

1) First Article Test approval remains in effect and production may continue unless:

a. The contractor fails Lot Acceptance Testing (LAT) requirements on two (2) consecutive lots. Should this occur, the contractor will immediately cease production (Stop Work) and conduct a Failure Analysis and provide such reports as required to facilitate the completion of a Corrective Actions Report (CAR) as directed by the Defense Contract Management Agency (DCMA) Quality Assurance Representative (QAR). The CAR will then be submitted to the QAR and the Contracting Officer Representative (COR) for review NLT 15 days after occurrence. The QAR and COR will determine within five (5) working days after receipt of the CAR if production of the approved First Article Test configuration may resume or if the contractor must conduct a new First Article Test for the issuance of a new First Article Test Approval Letter. If a new First Article Test is required, the contractor will submit the number of samples required to conduct a new First Article Test (at the contractor's expense) as directed by the COR, for the issuance of a new First Article Test Approval Letter. The First Article Test Report remains the property of the Government.

b. The number of failed lots exceeds the maximum lot failures allowed under Table V below submitted during the period of the contract using the approved First Article Test design. Should this occur, the contractor must immediately cease all production (Stop Work), conduct a Failure Analysis and provide such reports as required to facilitate the completion of a CAR as directed by DCMA QAR. The CAR will then be submitted to the QAR and the COR for review NLT 15 days after occurrence. The QAR and COR will determine within five (5) working days after receipt of the CAR if they are satisfied that the contractor has corrected the production issues that resulted in the lot failures. The contractor will then submit the number of samples required for the conduct of a new First Article Test (at the contractor's expense) as directed by the COR, for the issuance of a new First Article Test Approval Letter. The First Article Test Report remains the property of the Government.

Table V. Maximum Lot Failures

Total Lots Submitted	Max Lot Failures Allowed
1-100	3
101-200	3
201-300	3
Every 100 lots thereafter	3

c. The contractor does not manufacture a specific approved First Article Test design (when there are multiple approved designs) for a period of 180 consecutive production days. Non-production under this stipulation will result in automatic revocation of the First Article Test approval for that design.

Additionally, when a lot fails Lot Acceptance Testing and is subsequently rejected, that lot is rejected in its entirety and no ballistic component of that lot may be used in the production of any other lot. Further, any lot that is withdrawn prior to the completion of the Lot Acceptance Testing procedures as required by the Lot Acceptance Test Protocol will be considered as rejected and subject to the above conditions and restrictions. Additional Testing must be completed within 30 days of the initial Lot Acceptance Test. All failed Lot Acceptance Test's will require a Failure Analysis per the procedures outlined in 1) a.

2) BALLISTIC TESTING: ALL BALLISTIC TESTING FOR PRODUCTION LOTS SHALL BE CONDUCTED AT A GOVERNMENT TEST FACILITY OR AN NIJ CERTIFIED BALLISTIC LAB, AS DIRECTED BY THE CONTRACTING OFFICE. COPIES OF ALL BALLISTIC REPORTS ARE TO BE SUBMITTED TO THE COR FOR ACCEPTANCE PURPOSES.

3) BALLISTIC TESTING ON END ITEMS SHALL BE CONSIDERED LOT ACCEPTANCE TESTING. NOTIFY THIS OFFICE TEN DAYS PRIOR TO ANY TESTING IN THE EVENT THE GOVERNMENT WANTS TO WITNESS TESTING. NO LOT SHALL BE RELEASED FROM THE CONTRACTOR'S PLANT PRIOR TO RECEIPT OF PASSING TEST REPORTS THAT ARE APPROVED BY THE COR.

APPENDIX E: CONTENTS OF LABELS, AND USE AND CARE INSTRUCTIONS

Size, Identification, and Instruction Label. Label information is as listed within this appendix. Should an item be too small to mark with the complete label, label "C" will be utilized containing the Nomenclature, National Stock Number and any size information shall be used. Buckles, metal loops and other similar items not practically labeled shall have the appropriate label applied to the bulk packaging in accordance with MIL-STD-130. In addition to the man readable information listed in each example, a machine readable label with similar information will be included as either example "A", "B", or "C": in the following schema:

Example "A":

MFR (CAGE) 54321 **Lot# 12AB3**

SER NO 12348 **DOP 05/01/2009**

NSN 8470-01-520-7373 **PART # 55B123456789-10**

CONTRACT F33657-80-C-0310 **Size: Medium**

Example "B"

MFR (CAGE) 54321 **Size: Medium**

DOP 05/01/2009 **NSN 8470-01-520-7373**

PART # 55B123456789-10 **CONTRACT F33657-80-C-0310**

Example “C”

Size: Medium Nomenclature: Pull Cable
NSN 8470-01-520-7373 PART # 55B123456789-10
CONTRACT F33657-80-C-0310

IMPROVED MODULAR TACTICAL VEST
FRONT CARRIER
U.S.

THE IMPROVED MODULAR TACTICAL VEST (IMTV) WITH ALL SOFT BALLISTIC PANELS INSTALLED PROVIDES PROTECTION FROM FRAGMENTATION AND 9MM SUBMACHINE GUN OR LESSER THREATS. THIS VEST DOES NOT PROTECT AGAINST KNIVES OR SHARP OBJECTS.

DO NOT MACHINE WASH OR DRY. FAILURE TO FOLLOW THESE INSTRUCTIONS WILL DAMAGE THE VEST'S PROTECTIVE CAPABILITY.

CLEANING INSTRUCTIONS

1. Remove dirt from outer surface with a cloth or soft bristle brush.
2. Remove all ballistic panels and the Enhanced Small Arms Protective Inserts (ESAPI) and Enhanced Side Ballistic Inserts (ESBI) from the outer shell and the component carriers. Soft ballistic Panels are ONLY to be cleaned by removing loose dirt from the surface and wiping clean with a moistened cloth or a soft bristle brush. Avoid submerging the panels in water; DO NOT bleach! DO NOT machine wash! DO NOT dry clean! DO NOT apply solvents to the ballistic panels! If the ballistic panels become wet allow them to air dry flat away from heat sources and out of direct sunlight. If the ballistic panels become saturated with liquids such as bleaches, gasoline, petroleum, oils or lubricants, turn them in for replacement as soon as possible.
3. Hand wash the IOTV base vest and component outer shells only in cold water with soap or a very mild detergent. DO NOT USE CAUSTIC CLEANERS, CHLORINE BLEACH, YELLOW SOAP, CLEANING FLUIDS OR SOLVENTS, WHICH WILL DISCOLOR AND DETERIORATE THE ITEMS!
4. Rinse the outer shells very thoroughly in clean water to wash out the soap.
5. Air-dry indoors, or in the shade, AWAY FROM HEAT SOURCES.
6. DO NOT ATTEMPT TO DYE THE ITEM OR FIX DISCOLORATIONS.

TURN IN YOUR ITEM IF:

1. Frags or bullets have hit them.
2. The outer cover is torn or damaged beyond field repair.
3. The hook and loop cannot be closed completely or repaired.
4. The webbing is torn or damaged beyond repair.
5. The items cannot be adequately cleaned, or are badly discolored.
6. The items have open seams or broken components.

MFR (CAGE) 54321 **Size: Medium**

DOP 05/01/2009 **NSN 8470-01-520-7373**

PART # 55B123456789-10 **CONTRACT F33657-80-C-0310**

IMPROVED MODULAR TACTICAL VEST
BACK CARRIER

THE IMPROVED MODULAR TACTICAL VEST (IMTV) WITH ALL SOFT BALLISTIC PANELS INSTALLED PROVIDES PROTECTION FROM FRAGMENTATION AND 9MM SUBMACHINE GUN OR LESSER THREATS. THIS VEST DOES NOT PROTECT AGAINST KNIVES OR SHARP OBJECTS.

DO NOT MACHINE WASH OR DRY. FAILURE TO FOLLOW THESE INSTRUCTIONS WILL DAMAGE THE VEST'S PROTECTIVE CAPABILITY.

CLEANING INSTRUCTIONS

1. Remove dirt from outer surface with a cloth or soft bristle brush.
2. Remove all ballistic panels and the Enhanced Small Arms Protective Inserts (ESAPI) and Enhanced Side Ballistic Inserts (ESBI) from the outer shell and the component carriers. Soft ballistic Panels are ONLY to be cleaned by removing loose dirt from the surface and wiping clean with a moistened cloth or a soft bristle brush. Avoid submerging the panels in water; DO NOT bleach! DO NOT machine wash! DO NOT dry clean! DO NOT apply solvents to the ballistic panels! If the ballistic panels become wet allow them to air dry flat away from heat sources and out of direct sunlight. If the ballistic panels become saturated with liquids such as bleaches, gasoline, petroleum, oils or lubricants, turn them in for replacement as soon as possible.
3. Hand wash the IMTV base vest and component outer shells only in cold water with soap or a very mild detergent. DO NOT USE CAUSTIC CLEANERS, CHLORINE BLEACH, YELLOW SOAP, CLEANING FLUIDS OR SOLVENTS, WHICH WILL DISCOLOR AND DETERIORATE THE ITEMS!
4. Rinse the outer shells very thoroughly in clean water to wash out the soap.
5. Air-dry indoors, or in the shade, AWAY FROM HEAT SOURCES.
6. DO NOT ATTEMPT TO DYE THE ITEM OR FIX DISCOLORATIONS.

TURN IN YOUR ITEM IF:

1. Frags or bullets have hit them.
2. The outer cover is torn or damaged beyond field repair.
3. The hook and loop cannot be closed completely or repaired.
4. The webbing is torn or damaged beyond repair.
5. The items cannot be adequately cleaned, or are badly discolored.
6. The items have open seams or broken components.

MFR (CAGE) 54321 **Size: Medium**

DOP 05/01/2009 **System: NSN 8470-01-520-7373**

PART # 55B123456789-10 **CONTRACT F33657-80-C-0310**

IMPROVED MODULAR TACTICAL VEST- FRONT BALLISTIC INSERT

INSERT THIS SIDE TO BODY FAILURE TO INSERT THIS BALLISTIC INSERT IN THE IMTV OUTERSHELL WILL RESULT IN ABSENCE OF BALLISTIC PERFORMANCE FROM FRAGMENTATION & 9MM SUB-MACHINE GUN OR LESSER THREATS.

DO NOT LAUNDER BALLISTIC PANELS!

Avoid submerging in wash water. DO NOT bleach! DO NOT machine wash! DO NOT dry clean! DO NOT apply solvents!

FOR CLEANING: ONLY Remove loose dirt from surface & wipe clean with a moistened cloth or soft bristle brush. If Ballistic Panels become wet allow to air dry in a flat position away from heat sources & out of direct sunlight. If Ballistic panels become saturated with liquids such as bleaches, gasoline, petroleum, oils, or lubricants, TURN IN FOR REPLACEMENT AS SOON AS POSSIBLE.

MFR (CAGE) 54321 **Lot# 12AB3**

SER NO 12348 **DOP 05/01/2009**

NSN 8470-01-520-7373 **PART # 55B123456789-10**

CONTRACT F33657-80-C-0310 **Size: Medium**

IMPROVED MODULAR TACTICAL VEST- BACK BALLISTIC INSERT
:

INSERT THIS SIDE TO BODY FAILURE TO INSERT THIS BALLISTIC INSERT IN THE IMTV OUTERSHELL WILL RESULT IN ABSENCE OF BALLISTIC PERFORMANCE FROM FRAGMENTATION & 9MM SUB-MACHINE GUN OR LESSER THREATS.

DO NOT LAUNDER BALLISTIC PANELS!

Avoid submerging in wash water. DO NOT bleach! DO NOT machine wash! DO NOT dry clean! DO NOT apply solvents!

FOR CLEANING: ONLY Remove loose dirt from surface & wipe clean with a moistened cloth or soft bristle brush. If Ballistic Panels become wet allow to air dry in a flat position away from heat sources & out of direct sunlight. If Ballistic panels become saturated with liquids such as bleaches, gasoline, petroleum, oils, or lubricants, TURN IN FOR REPLACEMENT AS SOON AS POSSIBLE.

MFR (CAGE) 54321 **Lot# 12AB3**

SER NO 12348 **DOP 05/01/2009**

NSN 8470-01-520-7373 **PART # 55B123456789-10**

CONTRACT F33657-80-C-0310 **Size: Medium**

CUMMERBUND
U.S.

Refer to PLATE CARRIER or IMTV outershell label for cleaning and maintenance instructions.

MFR (CAGE) 54321 **Size: Medium**

DOP 05/01/2009 **NSN 8470-01-520-7373**

PART # 55B123456789-10 **CONTRACT F33657-80-C-0310**

SIDE PLATE POCKET
U.S.

Refer to PLATE CARRIER or IMTV outershell Label for cleaning and maintenance instructions.

MFR (CAGE) 54321 **Lot# 12AB3**

SER NO 12348 **DOP 05/01/2009**

NSN 8470-01-520-7373 **PART # 55B123456789-10**

CONTRACT F33657-80-C-0310 **Size: N/A**

QUICK RELEASE PULLCABLE

Refer to PLATE CARRIER or IMTV outershell Label for cleaning and maintenance instructions.

Size: Medium Nomenclature: Pull Cable
NSN 8470-01-520-7373 PART # 55B123456789-10
CONTRACT F33657-80-C-0310

CUMMERBUND ADAPTER
NSN:
Refer to PLATE CARRIER or IMTV outershell label for cleaning and maintenance instructions.

Size: N/A Nomenclature: Shoulder Strap
NSN 8470-01-520-7373 PART # 55B123456789-10
CONTRACT F33657-80-C-0310 Cage: 01234

Refer to PLATE CARRIER or IMTV outershell Label for cleaning and maintenance instructions.

Size: N/A Nomenclature: Shoulder Strap
NSN 8470-01-520-7373 PART # 55B123456789-10 CONTRACT
F33657-80-C-0310 Cage: 01234

Refer to PLATE CARRIER or IMTV outershell Label for cleaning and maintenance instructions.

YIB-YAB – SHOULDER STRAP

Refer to PLATE CARRIER or IMTV outershell Label for cleaning and maintenance instructions.

Size: N/A Nomenclature: YIB-YAB – SHOULDER STRAP
NSN 8470-01-520-7373 PART # 55B123456789-10
CONTRACT F33657-80-C-0310 Cage: 01234

Refer to PLATE CARRIER or IMTV outershell Label for cleaning and maintenance instructions.

IMPROVED MODULAR TACTICAL VEST
THROAT PROTECTOR

MFR (CAGE) 54321 **Lot# 12AB3**

SER NO 12348 **DOP 05/01/2009**

NSN 8470-01-520-7373 **PART # 55B123456789-10**

CONTRACT F33657-80-C-0310 **Size: Medium**

Refer to IMTV outershell label for cleaning and maintenance instructions.

IMPROVED MODULAR TACTICAL VEST
YOKE &COLLAR

MFR (CAGE) 54321 **Lot# 12AB3**

SER NO 12348 **DOP 05/01/2009**

NSN 8470-01-520-7373 **PART # 55B123456789-10**

CONTRACT F33657-80-C-0310 **Size: Medium**

Refer to IMTV outershell Label for cleaning and maintenance instructions.

IMPROVED MODULAR TACTICAL VEST
LOWER BACK PROTECTOR

MFR (CAGE) 54321 **Size: Medium**

DOP 05/01/2009 **NSN 8470-01-520-7373**

PART # 55B123456789-10 **CONTRACT F33657-80-C-0310**

Check to insure the correct side of the Ballistic Panel will be against the Body before attaching to the IMTV. Refer to IMTV outershell Label for cleaning and maintenance instructions.

LOT NUMBER:_____
DATE OF MFG:_____
SERIAL NO:_____
CONTRACT #:
CAGE CODE:

IMPROVED MODULAR TACTICAL VEST
GROIN PROTECTOR

MFR (CAGE) 54321 **Lot# 12AB3**

SER NO 12348 **DOP 05/01/2009**

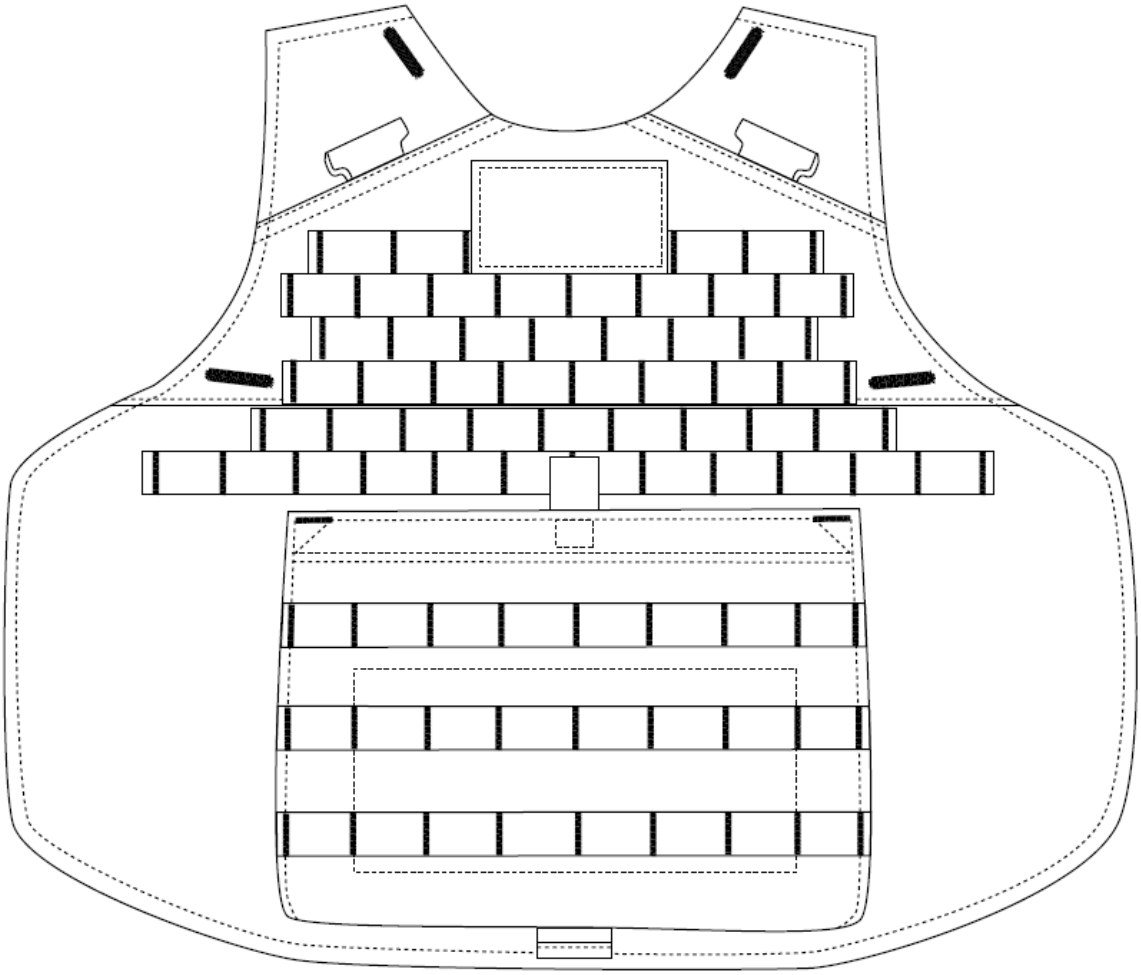
NSN 8470-01-520-7373 **PART # 55B123456789-10**

CONTRACT F33657-80-C-0310 **Size: Medium**

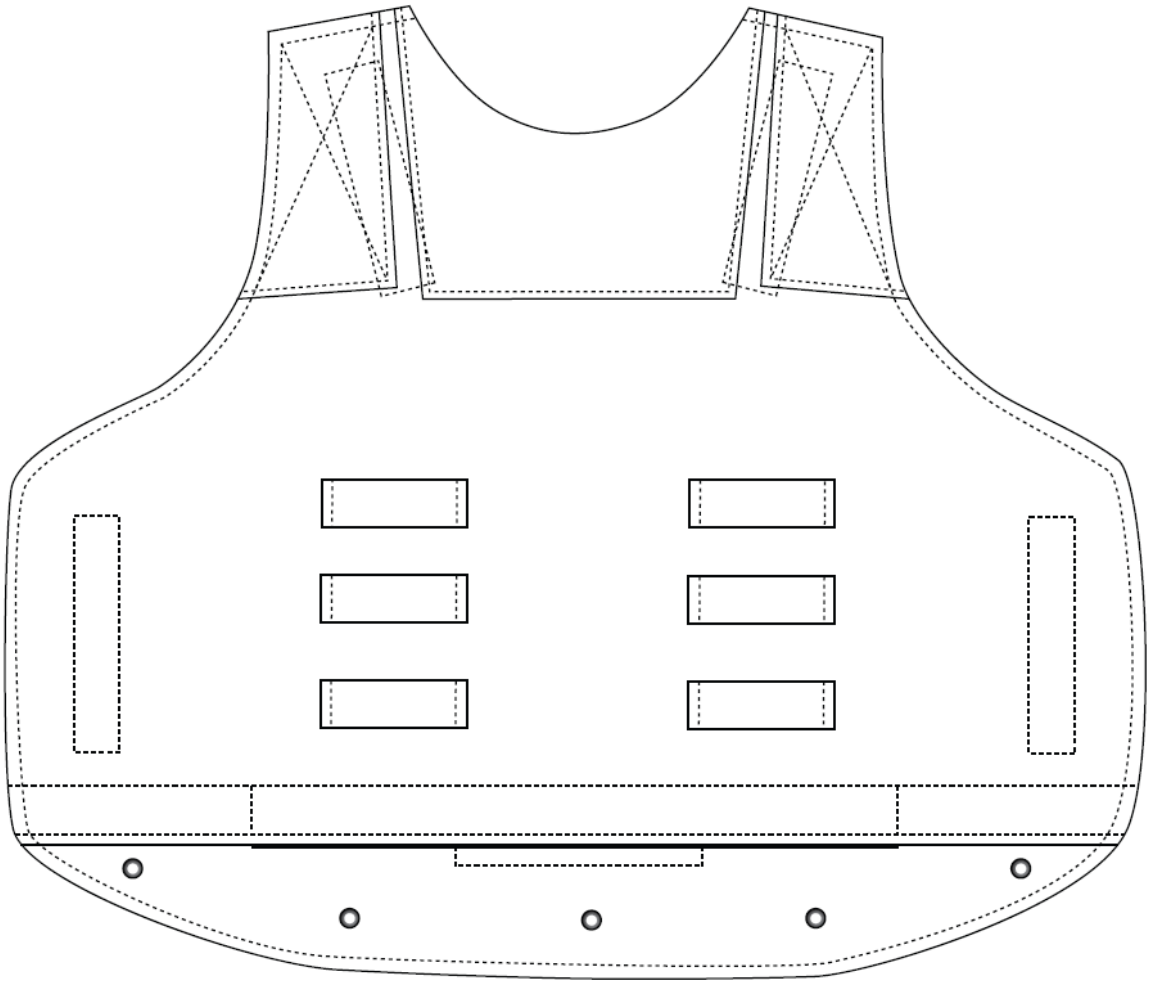
Check to insure the correct side of the Ballistic Panel will be against the Body before attaching to the IMTV. Refer to IMTV outershell Label for cleaning and maintenance instructions.

APPENDIX F: IMTV BASE VEST AND COMPONENT DRAWINGS
(For general reference only, not to be used in place of patterns)

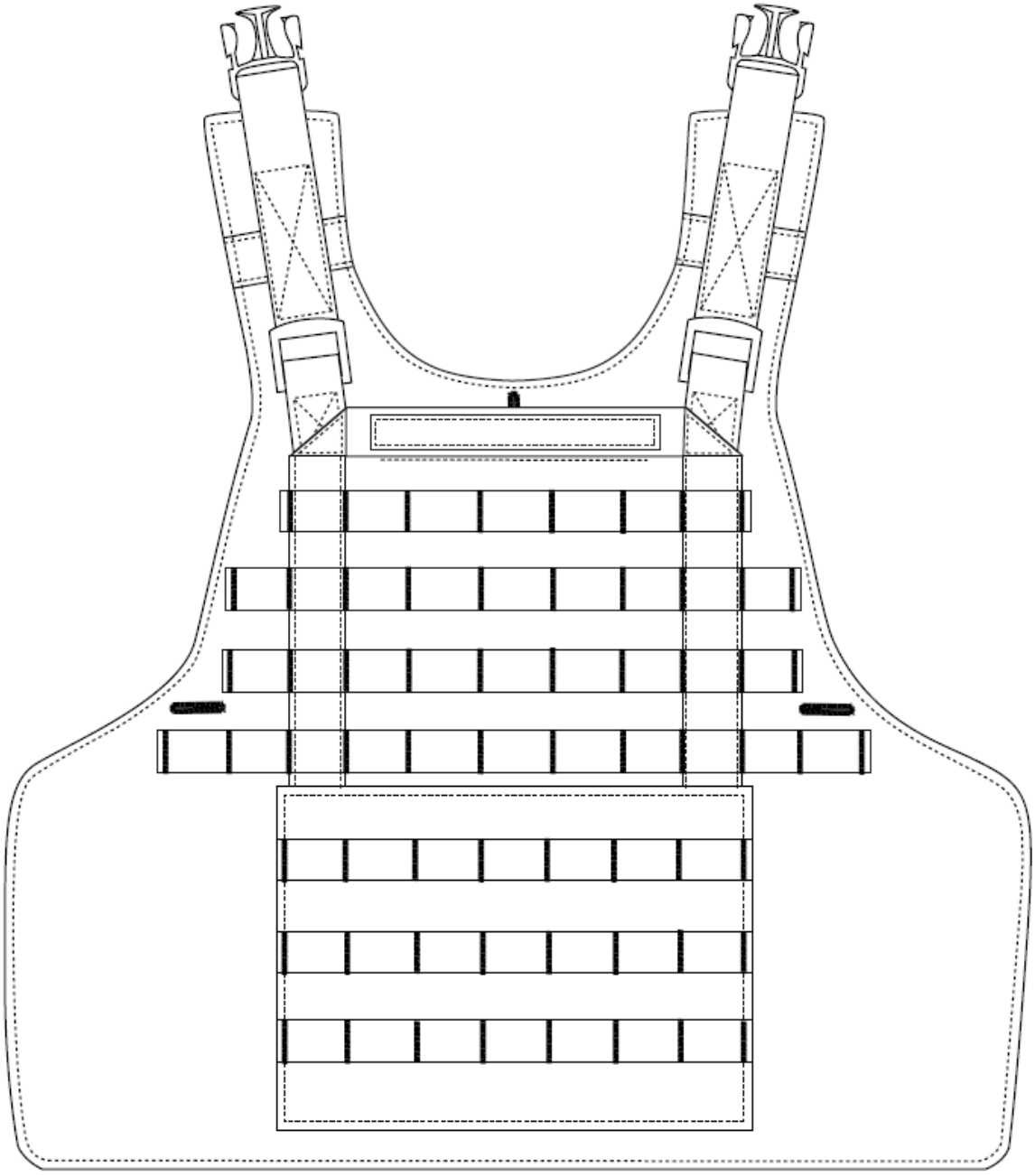
IMTV BASE VEST FRONT PANEL OUTER SHELL VIEW



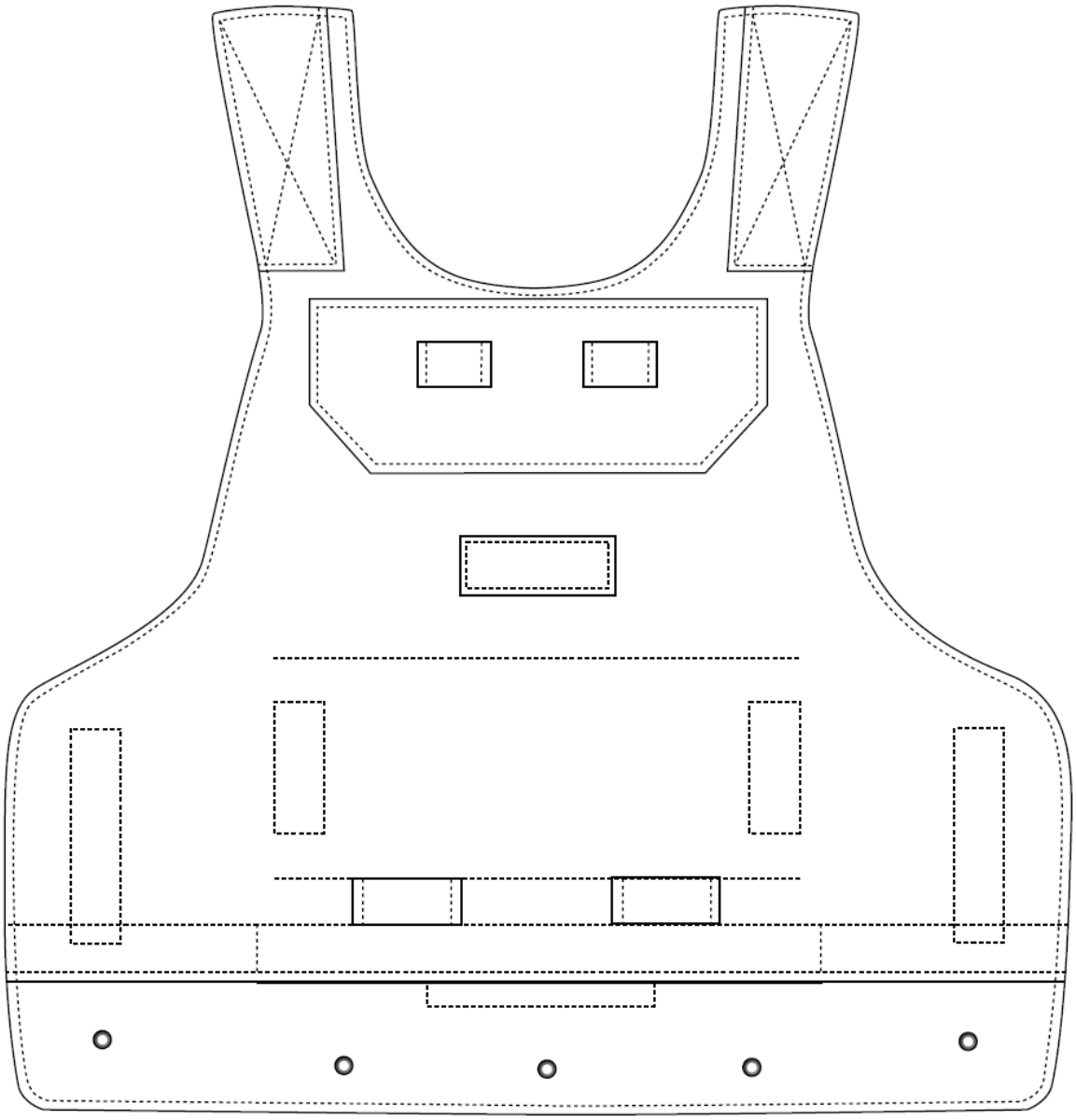
IMTV BASE VEST FRONT PANEL INNER SHELL VIEW



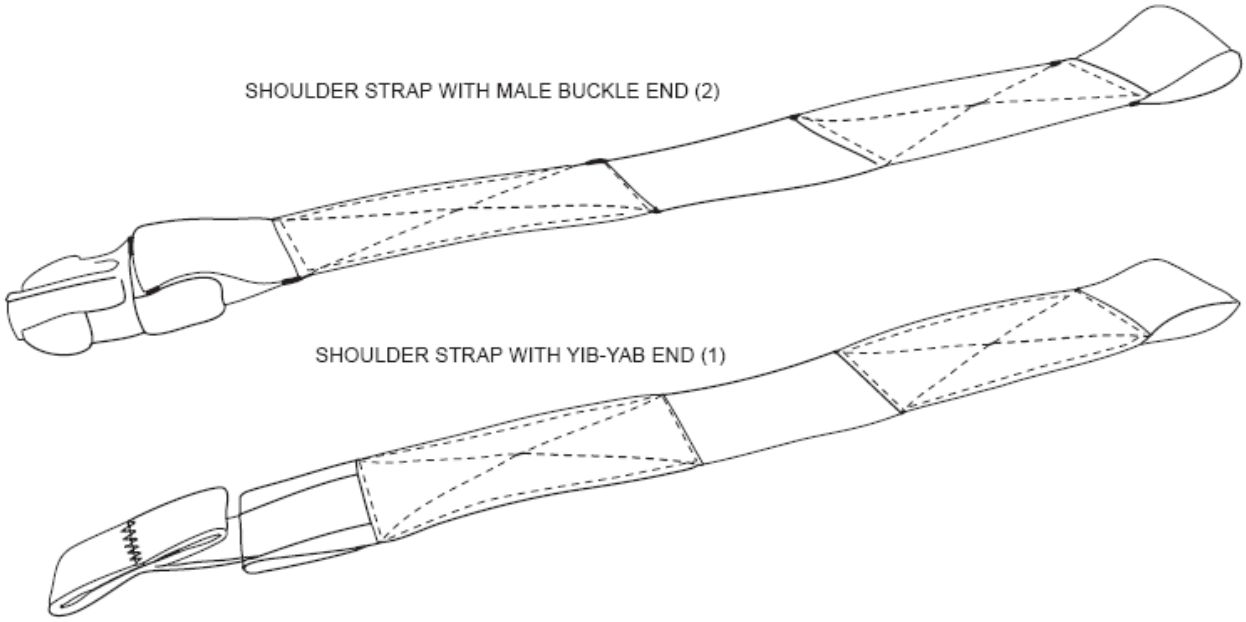
IMTV BASE VEST BACK OUTER SHELL VIEW



IMTV BASE VEST BACK INNER SHELL VIEW

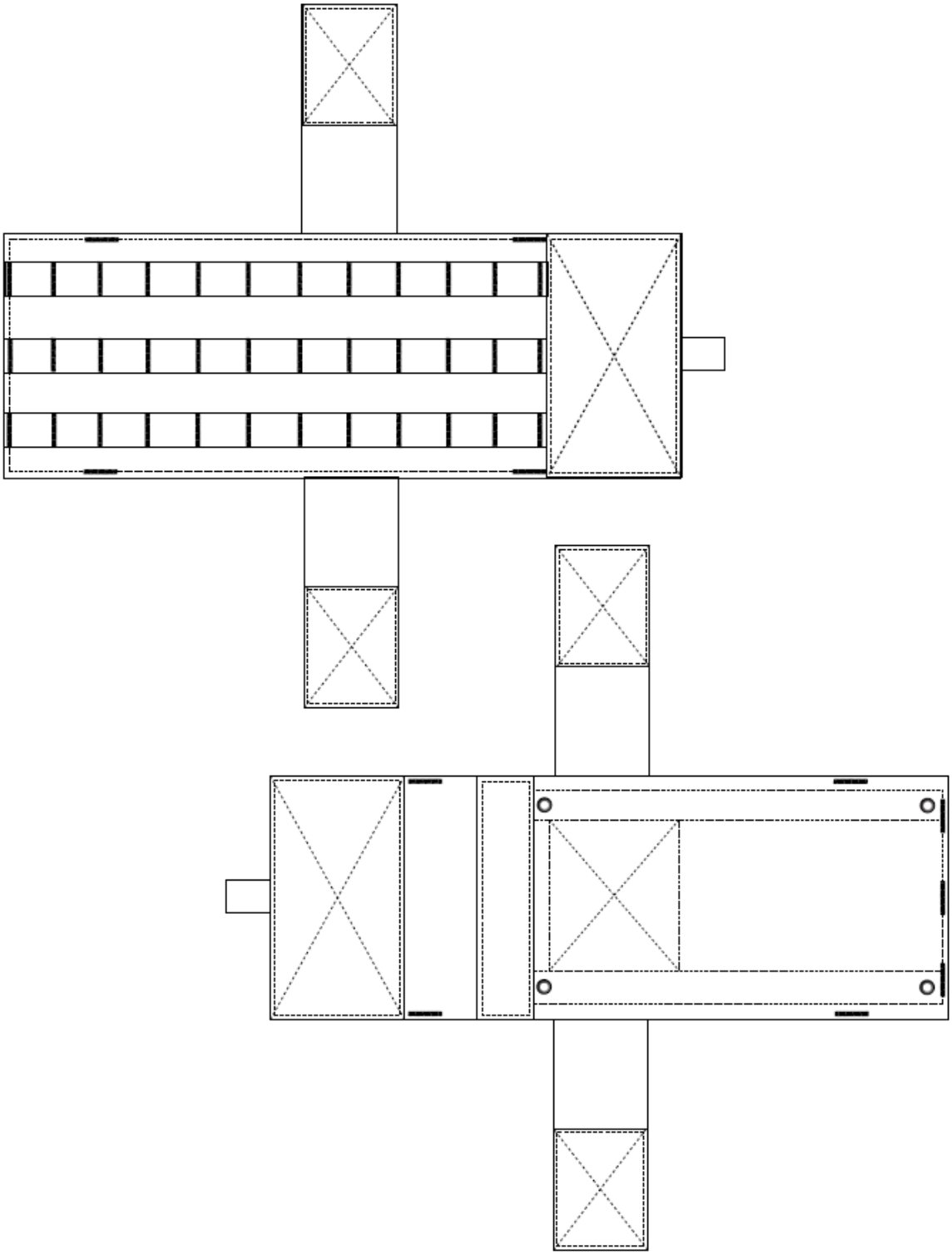


SHOULDER STRAPS

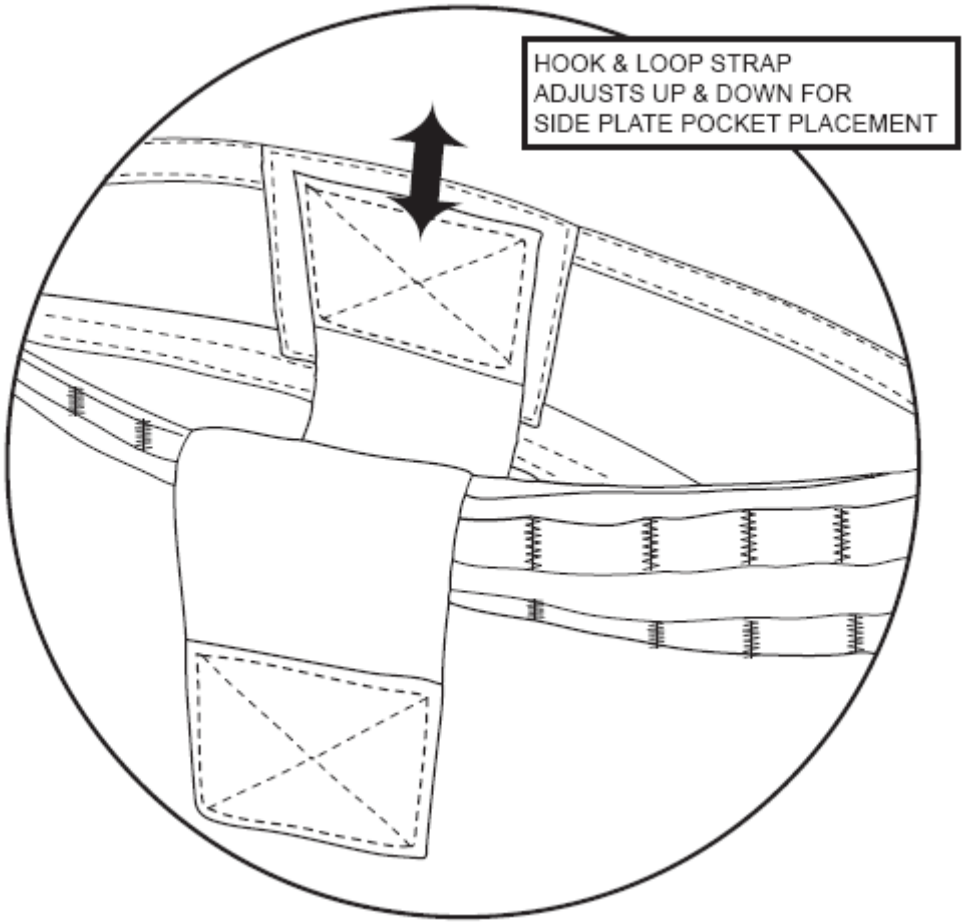


* NOT TO SCALE

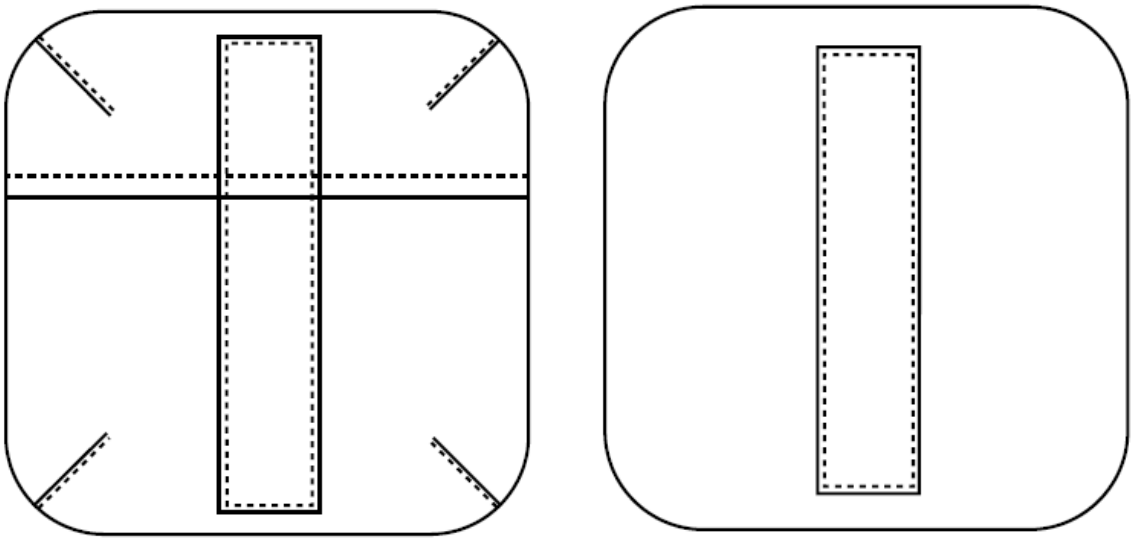
CUMMERBUND OUTER AND INNER SHELL VIEW

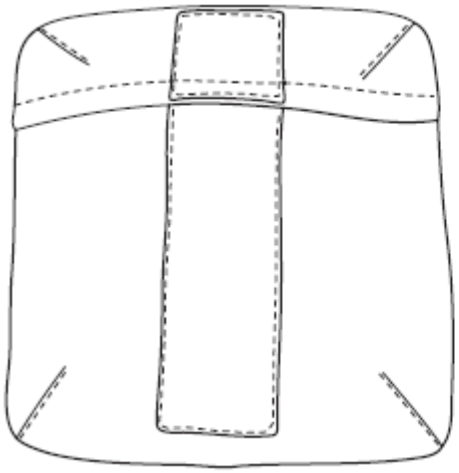


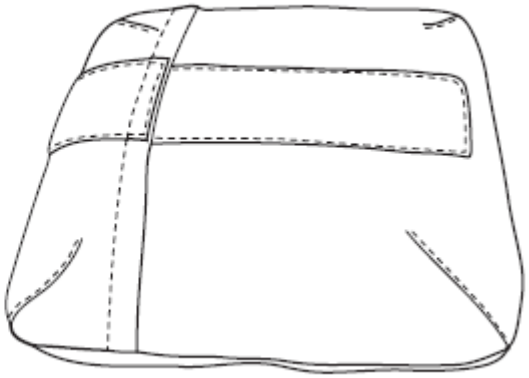
CUMMERBUND SLEEVE AND SIDE PLATE POCKET ADJUSTMENT STRAP



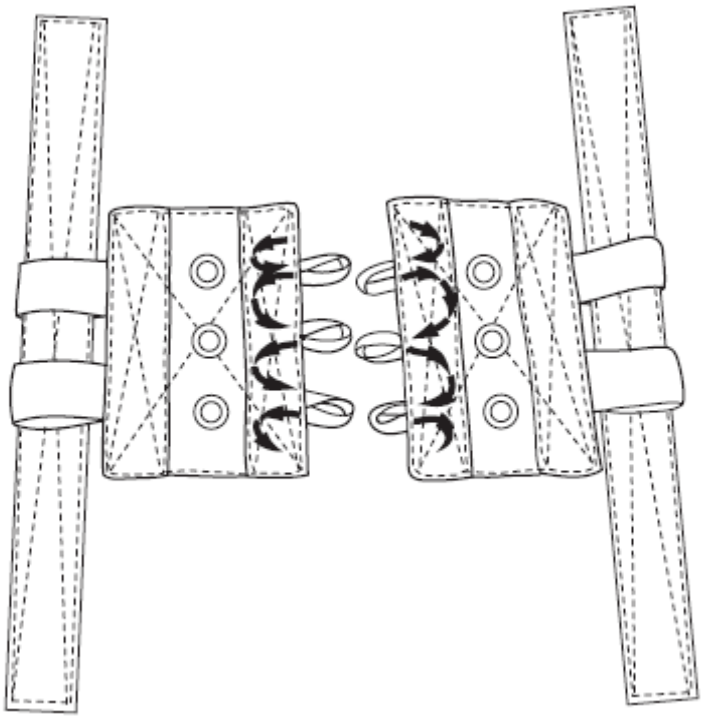
SIDE PLATE POCKET OUTER AND INNER SHELL VIEW





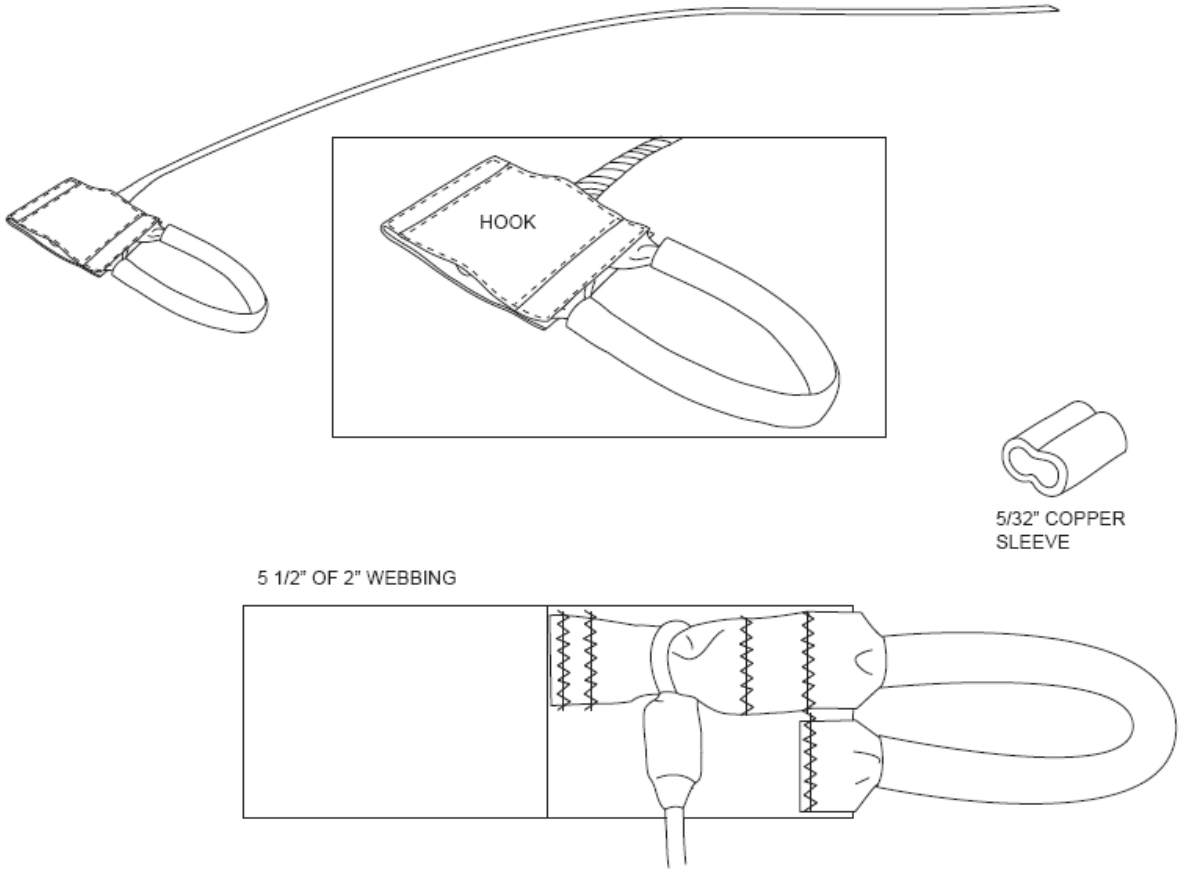


CUMMERBUND ADAPTERS

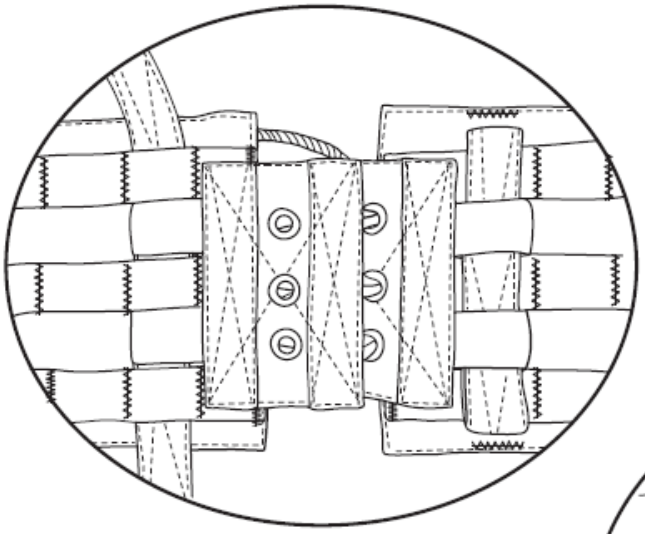


INSIDE ROUTING FOR CORD SHOWN WITH ARROWS

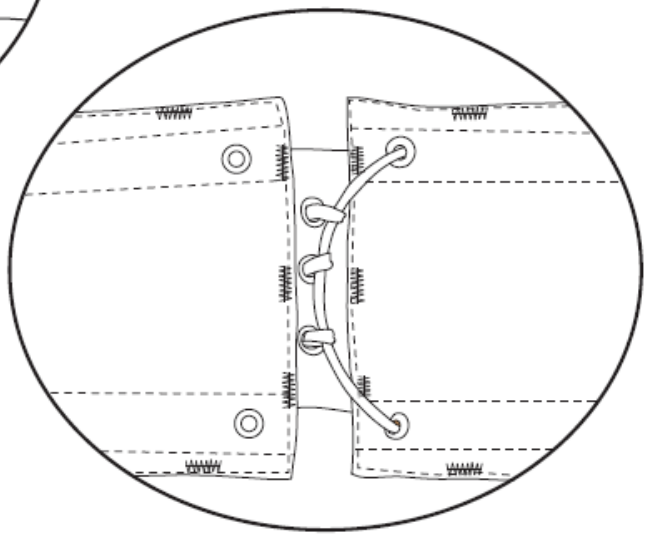
QUICK RELEASE CABLE



ATTACHMENT OF CUMMERBUND ADAPTERS AND QUICK RELEASE CABLE



TOP SIDE OF CUMMERBUND WITH ADAPTOR & QUICK RELEASE PULL CABLE FIXED



UNDER SIDE OF CUMMERBUND WITH ADAPTOR & QUICK RELEASE PULL CABLE FIXED