INCH POUND

FQ/PD 07-05G
20 JUN 2012
SUPERSEDES
FQ/PD 07-05F
8 FEB 2012

PURCHASE DESCRIPTION

BODY ARMOR, MULTIPLE THREAT / INTERCEPTOR IMPROVED OUTER TACTICAL VEST (IOTV) GENERATION III

This document is approved for use by all Departments and Agencies of the Department of Defense (DOD). Recommended improvements, simplifications, or reductions in paperwork are encouraged and should be directed to the preparing activity.

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 Outer Tactical Vest 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, front yoke and collar, back yoke and collar, lower back protector assembly, groin protector assembly, deltoid protector, small arms protective inserts (SAPI, ESAPI, XSAPI) shall be one type in the following sizes. Body armor, multiple threat will be issued separately as three subsystems, as follows.

a) The Improved Outer Tactical Vest (IOTV) subsystem; consisting of the base vest assembly, front yoke and collar, back yoke and collar, lower back protector assembly, groin protector assembly, and deltoid protector components.

COMPONENT	SIZES
Base Vest Assembly	11 sizes: X-Small, Small, Medium, Medium-Long, Large, Large-Long, X-Large, X-Large-Long, 2X-Large, 3X-Large, 4X-Large
Back Yoke and Collar	8 sizes: X-Small, Small, Medium, Large, X-Large, 2X-Large, 3X-Large, 4X-Large

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be used in improving this document should be addressed to: Project Manager – Soldier Protection and Individual Equipment, Program Executive Office – Soldier, US Army, 10170 Beach Road, Building 325, Fort Belvoir, Virginia

Front Yoke and Collar	8 sizes: X-Small, Small, Medium, Large, X-Large, 2X-Large, 3X-Large, 4X-Large
Lower Back Protector Assembly	One size
Groin Protector Assembly	2 sizes: X-Small to Medium, and Large to 4X-Large
Deltoid Protector	Three sizes: X-Small to Small, Medium to Large, and X-Large to 4X-Large

b) The SAPI subsystem; consisting of a set of ESAPI and XSAPI in the same size as the IOTV.

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

c) The Side Ballistic Insert (SBI) subsystem; consisting of a set of ESBI and XSBI in one standard size or a set of X-Small SAPI.

COMPONENT	SIZES
Side Ballistic Insert (ESBI and XSBI)	One size
Small Arms Protective Insert (ESAPI and XSAPI)	X-Small

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-10884	- Fasteners, Snap
MIL-DTL-32075	- Label: For Clothing, Equipage, and Tentage (General Use).
MIL-PRF-5038	- Tape, Textile and Webbing, Textile, Reinforcing Nylon
CO/PD 00-03*	- Small Arms Protective Inserts (SAPI)
CO/PD 04-19*	- Enhanced, Small Arms Protective Inserts (ESAPI)

FQ/PD 07-03*	- X Small Arms Protective Inserts (XSAPI)
AR/PD 11-06*	- Enhanced Side Ballistic Insert (ESBI)
AR/PD 10-03*	- X Side Ballistic Insert (XSBI)
A-A-55301	- Webbing, Textile Textured or Multi-Filament
A-A-55126	- Fastener Tape, Hook and Pile, Synthetic
A-A-55217	- Thread, aramid, spun staple
A-A-59826	- Thread, nylon, bonded
GL/PD 10-07	- Cloth, Duck, Textured Nylon
MIL-STD-662	- V50 Ballistic Test for Armor
MIL-STD-3027	- Performance Requirements and Testing of Body Armor (see 6.5)
MIL-W-17337	- Webbing, Textile, Woven Nylon
MIL-DTL-508	- Cloth, Oxford, nylon, 3 Ounce
MIL-STD-810	- Environmental Engineering Considerations and Laboratory Tests
MIL-STD-130	- Identification Marking of U.S. Military Property
ITOP 4-2-805	- Projectile Velocity and Time of Flight Measurements

(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).
* Available from the Product Manager Soldier Protective Equipment.

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.

DRAWINGS:
Project Manager – Soldier Protection and Individual Equipment, Program Executive Office – Soldier, Fort Belvoir, VA

Drawing No. 2-6-270	Enhanced Side Ballistic Insert
Drawing No. 2-6-0588	Enhanced Small Arms Protective Insert, Extra-Small
Drawing No. 2-6-0589	Enhanced Small Arms Protective Insert, Small
Drawing No. 2-6-0590	Enhanced Small Arms Protective Insert, Medium
Drawing No. 2-6-0589	Enhanced Small Arms Protective Insert, Large
Drawing No. 2-6-0590	Enhanced Small Arms Protective Insert, Extra-Large

NOTE: For any other camouflage patterns noted in the solicitation and/or contract, please contact contracting activity and the necessary drawings and/or patterns will be provided.

(Copies of drawings, patterns, 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 61	- Colorfastness to Laundering: Accelerated
AATCC METHOD 135	- Dimensional Changes of Fabrics after Home Laundering Related to ISO 3759

(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 E29	- Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
ASTM D-1149	- Standard Test Methods for Rubber Deterioration-Cracking in an Ozone Controlled Environment
ASTM D-1388	- Stiffness of Fabrics
ASTM D-1424	- Standard Test Method for Tearing Strength of Fabrics by Falling-Pendulum Type (Elmendorf) Apparatus
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-3886	- Abrasion Resistance of Textile Fabrics, (Inflated Diaphragm)
ASTM D-5034	- Breaking Force and Elongation of Textile Fabrics (Grab Test)
ASTM D-6193	- Standard Practice for Stitches & Seam
ASTM D-6413	- Standard Test Method for Flame Resistance of Textiles (Vertical Test)

(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)

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA INC.

NASM16491	- Grommet, metallic

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/ASQ Z1.4-2003	- Sampling Procedures and Tables for Inspection by Attributes

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 16022	- Information Technology Automatic Identification and Data Capture Techniques Data Matrix Bar Code Symbology Specification
ISO 15415	- Information Technology Automatic Identification and Data Capture Techniques, Bar code print quality test specification -- Two-dimensional symbols

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 and Lot acceptance/conformance inspection. When specified, complete body armor, multiple threat samples, representing full production quality, shall be subjected to first article test in accordance with 4.2 or conformance inspection in accordance with 4.3.

3.2 Materials and components. The materials and components shall conform to applicable specifications, standards, and patterns required herein. When part or component manufacturers are referenced herein it will be according to alphabetical order, not by preference. Camouflage color will be specified in the contract.

3.2.1 Cloth, outer shell. The outer shell fabric shall be textured nylon duck conforming to GL-PD 10-07 Type III Class 4, except that flame resistance shall be in accordance with paragraph 3.2.1.1.

3.2.1.1 Flame resistance. The finished outer shell cloth, as specified in 3.2.1, shall exhibit flame resistance. All materials tested shall be tested in both the warp and fill directions. The average melt/drip that occurs after removal of source flame shall be less than 1 droplet. The average after flame in each direction (warp and fill) shall be no longer than 3.0 seconds, the average afterglow in each direction shall be no longer than 2.0 seconds, and the average char length in each direction shall be no longer than 4.5 inches for samples prior to laundering (0 washes) and after laundering (5 washes). Laundering shall be conducted according to AATCC Method 135, and the vertical flame testing shall be conducted according to ASTM D 6413.

3.2.2 Cloth, inner shell. The inner shell fabric shall be textured nylon duck conforming to GL-PD 10-07 Type III Class 3.

3.2.3 Cloth, collar material. The collar material shall be conforming to MIL-DTL-508, Oxford, Nylon, 3 oz Type I, Class 3.

3.2.4 Cloth, ballistic panel cover. The ballistic panel cover should be 70 denier 1.9 oz. nylon ripstop. The cloth material shall have an average tear strength of 4.5 lbs in the warp direction and 7 lbs in the fill direction. The cloth material shall also have an average break strength of 160 lbs in the warp direction and 130 lbs in the fill direction. Average shall be computed from 5 samples. Tear strength shall be conducted according to ASTM D 1424, break strength testing shall be conducted according to ASTM D 5034.

3.2.5 Webbing and tapes. Webbings and tapes shall be heat cut smooth with no burrs or residual melt. When required, angles on webbings shall be 45° ±10° unless otherwise specified on the drawings or templates. Producer colored, textured, filament nylon (1000 denier warp/ 500 denier fill) and non-textured, filament nylon (840 denier warp/ 210 denier fill) constructions may be used. Webbings and tapes shall conform to the following requirements:

a) 3/4 inch Webbing; A-A-55301, Type IV, width 0.75 inch ±1/16. Producer colored or piece/yarn dyed, textured, filament nylon are acceptable: warp ends: 69 min; binder ends: 8 min; picks/inch: 66 min. Weight: 0.48 oz/yd min; break strength: 800 lbs min; thickness: 0.039 inch min.

b) 1 inch Webbing; A-A-55301, Type III, width 1.0 inch ±1/16. Alternate construction is not acceptable. Producer colored or piece/yarn dyed, textured, filament nylon are acceptable: warp ends: 101 min; binder ends: 15 min; picks/inch: 72 min. Weight: 0.50 oz/yd min; break strength: 1000 lbs min; thickness: 0.039 inch min.

c) 1 1/2 inch Webbing; A-A-55301, Type VI, width 1.5 inch ±1/16. Producer colored or piece/yarn dyed, textured, filament nylon are acceptable: warp ends: 144 min; binder ends: 16 min; picks/inch: 80 min. Weight: 0.90 oz/yd min; break strength: 1350 lbs min; thickness: 0.039 inch min.

d) 2 inch Webbing; MIL-W-17337 Class 2, width 2.0 inch ±1/8. Producer colored, textured, filament nylon: warp ends: 160 min; binder ends: 38 min; picks/inch: 72 min. Non-textured, filament nylon: warp ends: 193 min; binder ends: 46 min; picks/inch: 72 min. Weight: 1.15 oz/yd min; break strength: 1950 lbs min; thickness: 0.039 inch min.

e) 1 inch Tape; MIL-PRF-5038, Type III, Class 2, width 1.0 inch ±1/16. Producer colored, textured, filament nylon (500 denier warp/ 210 denier fill): warp ends: 84 min; picks/inch: 65 min. Non-textured, filament nylon (210 denier warp and fill): warp ends: 200 min; picks/inch: 66 min. Weight: 0.21 oz/yd min; break strength: 300 lbs min; thickness: 0.02 inch min.

3.2.6 Elastic, 3 inch. Elastic shall be heat cut smooth with no burrs or residual melt. Elastic shall conform to the following requirements: Width 3.0 inch ±1/8. Warp: textured polyester 150/1; filler: textured polyester 150/1, 1500 denier total; rubber- 45 ends 37G natural rubber; thickness: 0.050-0.055; weight: 1.5 oz/yd min; stretch: 100% min; finish: calendered.

3.2.7 Fasteners, hook and loop. Hook and loop fasteners shall conform to A-A-55126, Type II, Class 1 in 5/8, 1, 1 1/2, 2, and 4 inch widths.

3.2.8 Snap fasteners. Snap fasteners shall conform to MIL-DTL-10884 style 2, hard action. The snap fasteners shall have a black chemical finish, except that the button cap shell shall have an enamel 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. The snap fasteners component's part numbers shall be in accordance with the above description and NASM 27980, referenced in MIL-DTL-10884

3.2.9 Foam. The foam (located within the yoke) shall be closed cell with a density of 3.6-7.3 lb/ft^3. Thickness shall be 1/4 inch ±1/16 when tested as specified in ASTM D-3575.

3.2.10 Thread. Thread, nylon, bonded, Size E (Tex 70-76) or Size F (Tex 90-112), A-A-59826, Type II, Class A as required.

3.2.11 Thread, ballistic. Thread, aramid, spun staple, Size Tex 50, A-A-55217, Type I.

3.2.12 Polyethylene. 0.045 inch ±0.005 thick, high density.

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

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

3.2.15 Ladderloc. 1 1/2 inch, acetal, ITW P/N 154-0150 or National Molding P/N 7425, or equivalent.

3.2.16 D-Ring. 1 1/2 inch, acetal, ITW P/N 110-0150 or National Molding P/N 4775, or equivalent.

3.2.17 Webbing hanger. 5 x 1 inch, acetal, National Molding P/N 10191, or equivalent.

3.2.18 Female buckle, non adjustable.

a) 1 inch, acetal, ITW P/N 101-0100, National Molding P/N 5001, or equivalent.

b) 1 1/2 inch, acetal, National Molding P/N 9402, or equivalent.

3.2.19 Female buckle, adjustable. 1 1/2 inch, acetal, National Molding P/N 9403, or equivalent.

3.2.20 Male buckle, non adjustable. 1 1/2 inch, acetal, National Molding P/N 9406, or equivalent.

3.2.21 Male buckle, repairable. 1 1/2 inch, acetal, National Molding P/N 10213, or equivalent.

3.2.22 Emergency release assembly. The emergency release mechanism shall consist of low profile lever based activator which is housed on an acetal base plate of 2.5 x 3.0 inches (height x width). The lever shall be activated by pulling from the vertical position downward to a position normal to the torso. The lever shall be connected to four steel cables, each of which connects to a corresponding male buckle at the shoulder or waist connection points. Each steel cable shall be housed in a plastic sleeve. The male buckles at the shoulder and waist connection points shall be activated by a tensile force on the steel cable or as a conventional side squeeze buckles. The entire system shall be field repairable using only pliers and a standard Phillips or flat screwdriver. National Molding P/N 10160 or equivalent.

3.2.23 Groin Protector Attachment clip. 2 inch, acetal, National Molding P/N 5320, or equivalent.

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 IOTV subsystem (see 3.3.2) consists of (1) One base vest assembly made up of a camouflage outershell base vest carrier with a ballistic insert set made up of removable ballistic (back and front) inserts, (2) One yoke and collar assembly made up of one each front and back yoke and collar, (3) One groin protector assembly made up of a groin protector carrier with a removable ballistic insert and a removable contoured plastic stiffener, (4) One lower back protector assembly made up of a lower pack protector carrier with a removable ballistic insert, and (5) Two deltoid protectors with removable ballistic inserts. Components are all attached to the IOTV. The IOTV provides protection from conventional fragmenting munitions and multiple hits from 9mm handgun rounds. The SAPI, ESAPI or XSAPI subsystem consists of a set of interchangeable, sized, and contoured plates inserted into front and back pockets inside the IOTV carrier to provide vital organs protection against multi-hits of small arms rifle bullets and indirect fire flechettes. The ESBI subsystem consists of a set of interchangeable, contoured plates inserted into left and right side pockets of the IOTV carrier. Webbing hanger attachments on the front of the IOTV

outershell carrier 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) IOTV base vest only; which does not include any of the front and back yoke and collar, groin protector, lower back protector, deltoid protector or SAPI, ESAPI or XSAPI modular components.

b) IOTV base vest with one or more, or all of the modular components; front and back yoke and collar, groin protector, lower back protector, deltoid protector and/or one or two SAPI, ESAPI, or XSAPI

c) IOTV base vest 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 needed 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 inch seam allowance ±1/16 inch 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 inch 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 inch to ensure maximum protective area of coverage is achieved (see paragraph 3.3.2, Table I-B). Drill holes are not permitted.

3.3.1.1 Cloth, outer shell (GL-PD 10-07, Type III, Class 4).

Item	Nomenclature	Computer Nomenclature	Cut
1.	Front Outer Shell	F OUT SH	1 Face Up
2.	Front Flap	F FL	1 Face Up
3.	Front Flap Inner	F FL IN	1 Face Up
4.	Front Shoulder Cover Arm	F SHCVRARM	1 Pair
5.	Front Shoulder Cover Neck	F SH CVRNK	1 Pair
6.	Front Quick Release Flap	F QR FLAP	1 Face Up
7.	Front Quick Release Pocket	F QR PKT	1 Face Up
8.	Back Outer Shell	B OUT SH	1 Face Up
9.	Back Pocket Flap	B PK FL	1 Face Up
10.	Back Center Flap	B CTR FL	1 Face Up
11.	Back Channel Cover	B CH CVR	1 Pair
12.	Side Plate Carrier Outer Shell	SPC OUT SH	1 Pair
13.	Side Plate Carrier Plate Pocket	SPC P PK	1 Pair
14.	Side Plate Carrier Pocket Bottom Overlay	SPC P PK B	1 Pair
15.	Side Plate Carrier Plate Pocket Inner Cap	SPC P PKINCAP	1 Pair
16.	Side Plate Carrier Plate Pocket Cap Top	SPC P PKCT	1 Pair
17.	Side Plate Carrier Plate Pocket Outer Cap	SPC PPKOTC	1 Pair
18.	Collar Front Outer Shell	CLR FOUTS	1 Face Up
19.	Collar Back Outer Shell	CLR BOUTS	1 Pair

20.	Lower Back Protector Outer Shell	LBP OUT SH	1 Face Up
21.	Groin Protector Outer Shell, Upper	GP OUT UP	1 Face Up
22.	Groin Protector Outer Shell, Lower	GP OUT LW	1 Face Up
23.	Groin Protector Top Flap	GP TOP FL	1 Face Up
23.	Groin Protector Inner Shell	GP IN SH	1 Face Up
24.	Deltoid Outer Shell, Upper Inner	DLT UP IN	1 Face Up
25.	Deltoid Outer Shell, Lower Inner	DLT LW IN	1 Face Up
26.	Deltoid Outer Shell	DLT OUT SH	1 Face Up
27.	Deltoid Arm Strap Channel	DLT CHNL	1 Face Up

3.3.1.2 Cloth, inner shell (GL-PD 10-07, Type III, Class 3).

Item	Nomenclature	Computer Nomenclature	Cut
1.	Front Flap Pocket	F FL PK	1 Face Up
2.	Front Inside Plate Pocket	F IN P PKT	1 Face Up
3.	Front Inner Shell Upper	F IN SH UP	1 Face Up
4.	Front Inner Shell Lower	F IN SH LW	1 Face Up
5.	Front Inner Shell Side	F IN SH S	1 Pair
6.	Back Plate Pocket	B PL PK	1 Face Up
7.	Back Center Flap Pocket	B CTRFL PK	1 Face Up
8.	Back Center Inner Flap	B CTRFL IN	1 Face Up
9.	Back Inner Shell Upper	B IN SH UP	1 Face Up
10.	Back Inner Shell Lower	B IN SH LW	1 Face Up
11.	Back Inner Shell Side	B IN SH S	1 Pair
12.	Side Plate Carrier Inner Shell	SPC IN SH	1 Pair
13.	Side Plate Carrier Label Underlay	SPC LBLUNLY	1 Pair
14.	Yoke Front Outer Shell	YK F OUTSH	1 Face Up
15.	Yoke Front Inner Shell	YK F IN SH	1 Face Up
16.	Yoke Back Outer Shell	YK B OUT SH	1 Face Up
17.	Yoke Back Inner Shell	YK B IN SH	1 Face Up
18.	Lower Back Protector Inner Shell Upper	LBP INSHUP	1 Face Up
19.	Lower Back Protector Inner Shell Lower	LBP INSHL	1 Face Up
20.	Extra Small Back Plate Pocket Insert	XS B PKINS	1 Face Up
21.	Small Back Plate Pocket Insert	S B PK INS	1 Face Up
22.	Medium Back Plate Pocket Insert	M B PK INS	1 Face Up
23.	Large Back Plate Pocket Insert	L B PK INS	1 Face Up

3.3.1.3 Collar material (MIL-DTL-508, Oxford, Nylon, 3 oz Type I, Class 3).

Item	Nomenclature	Computer Nomenclature	Cut
1.	Collar Front Inner Shell	CLR F INSH	1 Face Up
2.	Collar Back Inner Shell	CLR B INSH	1 Pair

3.3.1.4 Ballistic panel cover.

Item	Nomenclature	Computer Nomenclature	Cut
1.	Front Ballistic Cover Outer	F BLCVROUT	1 Face Up
2.	Front Ballistic Cover Inner	F BL CVRIN	1 Face Up
3.	Back Ballistic Cover Outer	B BLCVROUT	1 Face Up

4.	Back Ballistic Cover Inner	B BLCVR IN	1 Face Up
5.	Lower Back Protector Ballistic Cover Outer	LBP BLCVRO	1 Face Up
6.	Lower Back Protector Ballistic Cover Inner	LBP BLCVRI	1 Face Up
7.	Groin Protector Ballistic Cover Outer	GP BLCVRO	1 Face Up
8.	Groin Protector Ballistic Cover Inner	GP BLCVRI	1 Face Up
9.	Deltoid Protector Ballistic Cover Outer	DLT BLCVRO	1 Face Up
10.	Deltoid Protector Ballistic Cover Inner	DLT BLCVRI	1 Face Up

3.3.1.5 Ballistic panel.

Item	Nomenclature	Computer Nomenclature	Cut
1.	Front Ballistic	F BL	1
2.	Back Ballistic	B BL	1
3.	Collar Front Ballistic Narrow	CLR F BLNR	1
4.	Collar Front Ballistic Wide	CLR F BLWD	1
5.	Collar Back Ballistic Narrow	CLR B BLNR	1 Pair
6.	Collar Back Ballistic Wide	CLR B BLWD	1 Pair
7.	Yoke Front Ballistic	YK F BL	1
8.	Yoke Back Ballistic	YK B BL	1
9.	Lower Back Protector Ballistic	LBP BL	1
10.	Groin Protector Ballistic	GP BL	1
11.	Deltoid Protector Ballistic	DLT BL	1

3.3.1.6 Foam.

Item	Nomenclature	Computer Nomenclature	Cut
1.	Yoke Front Foam	YK F FM	1
2.	Yoke Back Foam	YK B FM	1

3.3.1.7 Polyethylene.

Item	Nomenclature	Computer Nomenclature	Cut
1.	Side Plate Carrier Stiffener	SPC STF	1 Pair
2.	Side Plate Carrier Pocket Strap Stiff.	SPC PK STS	4
3.	Back Channel Cover Stiff.	B CH PL TM	1 Pair
4.	Contoured Groin Stiff.	(separate drawing of same name)	

3.3.1.8 Fastener tape, hook and loop (A-A-55126).

Item	Nomenclature	Cut
1.	5/8” Hook	Pieces are per pattern marking
2.	1" Hook	Pieces are per pattern marking
3.	1.5" Hook	Pieces are per pattern marking
4.	2" Hook	Pieces are per pattern marking
5.	4" Hook	Pieces are per pattern marking
6.	5/8” Loop	Pieces are per pattern marking
7.	1" Loop	Pieces are per pattern marking
8.	1.5" Loop	Pieces are per pattern marking
9.	2" Loop	Pieces are per pattern marking

10.	4" Loop	Pieces are per pattern marking

3.3.1.9 Tape, 1 inch binding (MIL-PRF-5038).

Item	Nomenclature	Usage as Required
1.	Front Shoulder Cover Arm Top Edge	
2.	Front Shoulder Cover Neck Top Edge	
3.	Front Flap Edge	
4.	Front Flap Pocket Bottom Edge	
5.	Front Plate Pocket Top and Bottom Edge	
6.	Back Center Flap Upper and Side Flap Edges	
7.	Back Flap Pocket Bottom Edge	
8.	Back Inside Plate Pocket Top and Bottom Edge	
9.	Side Plate Carrier Edge	
10.	Side Plate Carrier Right and Left Plate Pocket Flap Outer Edge	
11.	Side Plate Carrier Right and Left Inner Cap Bottom Edge	
12.	Yoke Back Outside and Inside Edge	
13.	Yoke Front Outside and Inside Edge	
14.	Lower Back Protector Edge	
15.	Lower Back Protector Overlay Ends	

3.3.1.10 Webbing, 3/4 inch (A-A-55301, Type IV).

Item	Nomenclature	Cut
1.	Quick Release Handle	Pieces are per pattern marking

3.3.1.11 Webbing, 1 inch (A-A-55301, Type III, camouflage).

Item	Nomenclature	Cut
2.	Front	Pieces are per pattern marking
3.	Front Flap	Pieces are per pattern marking
4.	Back	Pieces are per pattern marking
5.	Back Center Flap	Pieces are per pattern marking
6.	Side Plate Carrier Outer Shell	Pieces are per pattern marking
7.	Lower Back Protector Overlay	Pieces are per pattern marking
8.	Deltoid Protector Outer Shell	Pieces are per pattern marking

3.3.1.12 Webbing, 1 inch (A-A-55301, Type III).

Item	Nomenclature	Cut	Qty
1.	Front Inner Yoke Attachment	2 1/8	4
2.	Front Inner Yoke Attachment	2 5/8	2
3.	Front Inner Groin Attachment	2 1/8	2
4.	Front and Back Center Flap Closures	8	2
5.	Back Inner Yoke Attachment	2 1/8	4
6.	Back Inner Lower Back Attachment	2 1/8	2
7.	Back Side Plate Carrier Attachment	per pattern	
8.	Side Plate Carrier Inner Shell	per pattern	
9.	Side Plate Carrier Loop Attachment	6	6

10.	Side Plate Carrier Pocket Attachment	8.5	6
11.	Side Plate Carrier Pocket Ladder Attachment	13 1/4	4
12.	Side Plate Carrier Pocket Snap Reinforcement	5	2
13.	Yoke/Collar Assembly Front and Back Attachment	2 1/8	4
14.	Yoke/Collar Assembly Front and Back Strap	7.25 w/Angle	4
15.	Lower Back Protector Strap	9.75	2
16.	Groin Protector Buckle Loop	3	1

3.3.1.13 Webbing, 1 1/2 inch (A-A-55301, Type VI).

I Item	**Nomenclature**	**Cut**	**Qty**
1.	Front Right and Left Shoulder Straps	per pattern	2
2.	Side Plate Carrier Front Buckle Straps	per pattern	2
3.	Groin Protector Belt Attachment	per pattern	1

3.3.1.14 Webbing, 2 inch (MIL-W-17337).

Item	**Nomenclature**	**Cut**	**Qty**
1.	Front Inside Plate Pocket	12	1
2.	Front D-Ring Reinforcement	per pattern	
3.	Front Quick Release Buckle Reinforcement	per pattern	
4.	Back Drag Strap	per pattern	
5.	Yoke/Collar Assembly Front Inner	4 1/2	2
6.	Groin Protector Inner Upper	per pattern	1
7.	Groin Protector Inner Lower	per pattern	1

3.3.1.15 Elastic, 3 inch.

Item	**Nomenclature**	**Cut**	**Qty**
1.	Side Plate Pocket Inner Cap	per pattern	2

3.3.1.16 Templates.

Item	**Nomenclature**	**Computer Nomenclature**
1.	Front Outer Shell Reverse	F O S RE T
2.	Front Flap Reinforcement	F FL RE TM
3.	Front Shoulder Buckle Strap	F SHL B ST
4.	Front Should D-ring Attachment	F SHL DR T
5.	Front and Back Inner Plate Pocket Strap	FB INPL P S
6.	Quick Release Handle	QR HANDL T
7.	Side Plate Carrier Webbing	SPC OUTSWT
8.	Side Plate Carrier Webbing Middle	SPC OUTSWM
9.	Yoke Front and Back Strap, Narrow	FB YK STNR
10.	Yoke Front Strap, Wide	FR YK STWD
11.	Center Front Side Plate Carrier Buckle	SPC CFSTRT
12.	Front Back Flap Strap	FB FLAP ST
13.	Side Plate Carrier Pocket Strap	SPC PK STT

3.3.2 IOTV subsystem. See paragraph 3.3 for IOTV configuration. The maximum finished weight of the IOTV subsystem components for each size is outlined in Table I-A when measured as specified in 4.6.5. The minimum area of ballistic coverage for each ballistic panel subcomponent in each size is outlined in, Table I-B when tested as specified in 4.6.4. Finished base vest measurements for each size are outlined in Table I-C when inspected as specified in 4.6.1.

TABLE I-A. Maximum IOTV component weights; lbs.

Finished Component	X-Small	Small	Medium	Medium-Long	Large	Large-Long	X-Large	X-Large-Long	2X-Large	3X-Large	4X-Large
Base Vest Assembly: Outer Base Vest Carrier & 2 Ballistic Panels	9.46	9.76	10.37	11.10	11.50	11.75	12.53	13.04	14.00	16.25	16.55
Front Yoke and Collar Assembly	0.65	0.66	0.70	0.70	0.72	0.72	0.72	0.72	0.76	0.76	0.76
Back Yoke and Collar Assembly	0.60	0.60	0.63	0.63	0.63	0.63	0.70	0.70	0.73	0.76	0.76
Groin Protector Assembly	0.92	0.92	0.92	0.92	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Lower Back Assembly	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Deltoid Protectors (2 each)	1.91	1.91	2.28	2.28	2.28	2.28	2.76	2.76	2.76	2.76	2.76
Total System	14.14	14.43	15.50	16.23	16.83	17.08	18.41	18.91	19.94	22.22	22.52

TABLE I-B. Minimum ballistic panel area; square inch.

Ballistic Panel	X-Small	Small	Medium	Medium-Long	Large	Large-Long	X-Large	X-Large-Long	2X Large	3X Large	4X Large
Front Panel	305	325	354	379	401	428	444	479	543	610	680
Back Panel	310	333	370	395	415	442	458	495	555	621	689
Back Collar	14	14	15	15	15	15	16	16	16	16	16

Ballistic Panel	X-Small	Small	Medium	Medium-Long	Large	Large-Long	X-Large	X-Large-Long	2X Large	3X Large	4X Large
Wide											
Back Collar Narrow.	9	9	9	9	9	9	10	10	10	10	10
Back Yoke	54	56	58	58	58	58	61	61	65	70	70
Front Collar Wide	44	44	45	45	45	45	46	46	46	46	46
Front Collar Narrow	27	27	27	27	27	27	28	28	28	28	28
Front Yoke	56	59	64	64	67	67	67	67	68	68	68
Groin Panel	65	65	65	65	79	79	79	79	79	79	79
Lower Back Panel	52	52	52	52	52	52	52	52	52	52	52
Deltoid Protector	85	85	106	106	106	106	130	130	130	130	130

TABLE I-C. IOTV finished measurements; inch.

Size	Center Front Length ±1/2”	Front Width ± 1/2”	Center Back Length ± 1/2”	Back Width ±1/2”
X-Small	17 1/4	25 1/8	18 3/4	24 3/8
Small Regular	17 1/2	26 1/8	19	25 1/4
Medium Regular	18	27 1/8	19 1/2	27 1/4
Medium-Long	19	27 1/4	20 1/2	27 1/4
Large Regular	18 3/4	29 1/8	20 1/4	29 1/4
Large-Long	19 3/4	29 1/8	21 1/4	29 3/8
X-Large Regular	19 1/2	31 1/8	21	31 1/4
X-Large-Long	20 1/2	31 1/8	22	31 3/8
2X-Large	21 1/2	33	23	33 3/8
3X-Large	22 1/2	34 7/8	24	35 3/8
4X-Large	23 1/2	36 7/8	25	37 1/2

3.4 Construction. The exterior of the system shall be edge stitched approximately 1/8 inch from all edges EXCEPT the front and back of the base vest. Fabric edges shall not ravel.

3.4.1 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.

3.4.2 Stitching. Stitching shall conform to ASTM D-6193, 9-12 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.

3.4.3 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.

3.4.4 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 table II when tested as specified in 4.7.

TABLE II. Bartack.

Characteristic	Stress points; All cloth	Webbing hangers; Webbing + cloth
Length; inch	3/8 min	3/4 ± 1/16

3.4.5 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 IOTV base vest.

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

b) Distance between horizontal webbing shall be 1 1/8 inch -0/+1/16. This requirement is not applicable to the inside of the side plate carrier and the back carrier attachment points for the side plate carrier.

c) Vertical bartacks on consecutive horizontal webbing rows shall be vertical aligned bottom to top in a vertical straight line.

3.4.6 Buttonhole. 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 1/8 inch with a finished cut of 1 inch -0/+1/16.

3.4.7 Snap setting. A hole shall be pre-punched to receive the button and eyelet components of the snap fastener. The fastener shall be securely clinched without cutting the adjacent materials, and no splits shall occur in the button or eyelet barrels.

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

3.5 Operating 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.

3.5.1 Camouflage. 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.

TABLE III. Camouflage shades.

COMPONENT(S) OR PART(S)	Universal Camouflage Pattern (UCP)	OEF Camouflage Pattern (OCP)
Cloth, outer shell	3-color pattern: Desert Sand 500 – Ground shade Foliage Green 502 Urban Gray 501	7-color pattern: Cream 524 Tan 525 Pale Green 526 Olive 527 Dark Green 528, Brown 529 Dark Brown 530
Cloth, inner shell Cloth, collar material	Foliage Green 504	Tan 499
Ballistic panel cover	Foliage Green 504	Foliage Green 504
Binding Tape Webbing (para 3.3.1.11)	3-color pattern: Desert Sand 500 – Ground shade Foliage Green 502 Urban Gray 501	5-color pattern: Cream 524 – Ground shade Olive 527 Dark Green 528 Brown 529 Dark Brown 530
Hook & loop fastener Webbing (para 3.3.1.10&12) Elastic Thread Labels	Foliage Green 504	Tan 499
Hardware Buckles Snaps	Foliage Green 504	Tan 499

3.5.1.1 Pattern execution. The pattern on the printed finished cloth and webbings shall be reproducible to the standard sample in respect to design, colors and registration of the respective areas. Various areas of the pattern shall be properly registered in relation to each other and shall present definite sharp demarcations with a minimum of feathering or spew. Each pattern area shall

show solid coverage; skitteriness exceeding that shown on the standard sample in any of the printed areas will not be acceptable. Solid shades shall demonstrate level dyeing uniformity. When the standard sample is not referenced for pattern execution, a pattern drawing shall be provided by the contracting or procuring activity upon request.

3.5.2 Spectral reflectance. All exterior components and parts of the body armor system shall conform to the following tables unless superseded by the requirements specified in 3.2. The requirement must be met for initial and after laundering when tested as specified in 4.8.2. Acetal hardware shall conform to the spectral reflectance requirements, Table IV-C.

TABLE IV-A. Camouflage colors (percent).

Wavelengths	UCP						OCP					
	Desert Sand 500		Urban Gray 501		Foliage Green 502		Cream 524 Tan 525		Pale Green 526 Olive 527 Brown 529		Dark Green 528 Dark Brown 530	
Nanometers	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
600	28	40	12	26	8	18	22	44	10	30	3	12
620	30	42	14	26	8	18	24	45	11	30	3	12
640	34	48	14	28	8	20	24	45	11	32	4	12
660	38	56	14	30	10	26	25	45	12	32	4	13
680	44	60	18	34	10	26	28	48	14	35	4	18
700	46	66	24	38	12	28	28	54	19	40	6	25
720	48	68	26	42	16	30	30	58	22	43	6	27
740	48	72	30	46	16	30	32	60	25	46	10	29
760	50	74	32	48	18	32	36	61	27	48	14	33
780	54	76	34	48	18	34	38	62	28	50	18	36
800	54	76	34	50	20	36	40	62	29	50	20	37
820	54	76	36	54	22	38	44	65	30	51	20	38
840	56	78	38	54	24	40	46	66	32	51	21	39
860	56	78	40	56	26	42	48	67	33	52	21	40

TABLE IV-B. Solid colors (percent).

Wavelengths	Foliage Green 504		Tan 499		Tan 380		Desert Sand 503	
Nanometers (nm)	Min	Max	Min	Max	Min	Max	Min	Max
600	8	26	8	26	28	40	28	40
620	8	26	8	26	30	42	30	42
640	8	28	8	30	32	48	34	48
660	10	30	8	34	34	54	38	56
680	10	34	12	38	40	58	44	60
700	12	38	12	40	42	60	46	66
720	16	42	16	46	42	60	48	68
740	16	46	22	50	44	62	48	72
760	18	48	30	50	44	62	50	74
780	18	48	34	54	46	64	54	76

800	20	50	36	56	48	64	54	76
820	22	54	38	58	48	64	54	76
840	24	54	38	58	48	64	56	78
860	26	56	40	60	50	66	56	78

TABLE IV-C. Acetal hardware (percent).

Wavelengths Nanometers (nm)	Foliage Green 504		Tan 499	
	Min	Max	Min	Max
600	8	18	16	26
620	8	18	18	26
640	8	18	20	30
660	10	26	22	34
680	10	26	26	38
700	12	28	30	40
720	20	36	32	46
740	26	40	36	50
760	30	52	36	54
780	32	56	38	58
800	32	60	40	59
820	34	60	42	60
840	36	60	44	60
860	36	60	48	60

3.5.3 Matching. All exterior components and parts of the body armor system shall match the color and appearance of the standard sample when tested as specified in 4.8.3.

3.5.4 Fungus resistance. All components and parts of the body armor system, including interior components, shall be resistant to fungal growth. The visual grading shall be less than or equal to 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 when tested as specified in 4.8.4

3.5.5 Functional integration. All body armor, multiple threat components shall be integrated for functional and physical interfaces for the same version of IOTV (Gen III). All ballistic panels must be interchangeable for all versions of IOTV. 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 IOTV 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.

3.5.5.1 SAPI and SBI pocket. The IOTV SAPI and SBI 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 ESBI, XSBI, ESAPI, or the XSAPI (see paragraph 2.2.2) to be easily and quickly inserted into and removed from the vest without struggle or force (see paragraph 4.8.5). The rear SAPI pocket shall contain a secondary pocket to accommodate a one-size-larger plate for sizes XS, SM, MD, MD-L, LG, and LG-L. The secondary pocket shall ensure proper placement of the larger plate and shall also utilize a hook and loop closure, in accordance with the patterns, in order

configure the default pocket opening to fit the regular plate. Open seams are allowed to account for stitching interference for the front plate pocket on sizes XS to MD.

3.5.6 Drag strap. The drag strap on the back of the IOTV carrier (all sizes) shall have a peak strength not less than 400 lbs when tested in accordance with paragraph 4.8.6, and also give rise 1/4 inch -0/+1/8 when measured in the center of the handle.

3.5.7 Emergency doffing. An emergency release mechanism shall be provided. The mechanism shall be a single point activator and located on the front (chest) portion of the vest and be capable of being operated with either hand, gloved or not. Upon activation of the mechanism, the vest shall separate into two distinct pieces; front and back (see paragraph 4.8.7).

3.5.8 Drainage. The IOTV shall provide a durable means to allow water in the vest to drain out. Grommets/eyelets/washers will be securely cinched without splitting in a manner that will prevent detachment from or cutting of the adjacent material (see paragraph 4.8.8).

3.6 Ballistic material system operating requirements. The ballistic package shall meet the following operating requirements.

3.6.1 Areal density. The ballistic material system (not including cloth ballistic panel cover) shall be in accordance with Table V for areal density, when tested in accordance with 4.9.1.

TABLE V. Maximum areal density (lb/ft^2).

Base	0.98
Yoke	0.40

3.6.2 Thickness. The ballistic material system (not including cloth ballistic panel cover) shall be in accordance with Table VI for thickness, when tested in accordance with 4.9.2.

TABLE VI. Maximum thickness (inches).

Base	0.30
Yoke	0.10

3.6.3 Flexibility. The ballistic material system shall not exceed 225 centimeters per gram when tested in accordance with 4.9.3.

3.6.4 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 in accordance with 4.9.4. A rating ≥ 3 is required.

3.7 Ballistic performance requirements. The IOTV shall provide the following ballistic protection levels when tested standalone or as a system:

a) IOTV provides fragmentation protection from conventional fragmenting munitions (see paragraph 3.7.1).

b) IOTV provides multi-hit handgun bullet protection for 9mm, 124 gr., Full Metal Jacket (FMJ) Remington projectile (see paragraph 3.7.2).

c) IOTV and ESAPI with ESBI (see paragraph 2.2) together provide multi-hit small arms bullet protection from:

(1) Threat Code A
(2) Threat Code B
(3) Threat Code C
(4) Threat Code D

d) IOTV and XSAPI with XSBI - classified

3.7.1 Fragmentation protection. The ballistic material system shall provide consistent ballistic performance. Table VII lists the required minimum V50 values for the ballistic system at specified obliquity when tested with the Fragment Simulating Projectile (FSP) and Right Circular Cylinder (RCC) for dry, wet, extreme temperature, accelerated aging, and POL conditions.

TABLE VII. Fragmentation protection; minimum V50.

Fragment projectile	V50@ 0 degree, Dry: ft/s	V50@ 0 degree, Wet: ft/s	V50@ 45 degree, Dry: ft/s
Base vest assembly, groin, collar, lower back and deltoid protector			
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
Yoke (with base)			
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
Yoke (without base)			
17 gr. FSP	1120	N/A	N/A

Any product improvements in the ballistic performance of the ballistic material system 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 ESAPI and XSAPI performance requirements (see paragraph 2.2).

3.7.2 Handgun protection. The ballistic material system shall be engineered to provide handgun protection. Table VIII 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 4.10.

TABLE VIII. Handgun; minimum V50 & V0 acceptance.

Projectile	V50@ 0 degree; ft/s (min)	V0 Acceptance @ 0 and 30; degree, ft/s	Deformation; mm (max)
9mm, 124 gr. FMJ Remington	1525	1400 +50/-0	44.0

3.8 Support or ownership requirements. The IOTV shall meet the following support or ownership requirements.

3.8.1 Size, identification, and instruction label. All markings must be visible in low light levels under 0.001 fc lighting and also in blackout conditions with an L-shaped standard Army issued flashlight with a red or blue filter. The label shall be of sufficient strength to withstand repeated abrasion during field use and cleaning, and include the following:

a) The IOTV base vest component and ballistic panel subcomponent shall have a combination of size, identification, serial number, ballistic protection level, date of manufacture, lot number, and instruction label for the entire IOTV system (see table IX for size).

b) The instruction label shall include do's and don'ts for use and cleaning instructions, and donning/doffing instructions for the entire IOTV system.

c) The instruction label shall be located on the inner side 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.

d) The modular components; front yoke/collar assembly, back yoke/collar assembly, right and left side plate carriers, lower back protector assembly, groin protector assembly, deltoid protector assembly and ballistic panels 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 at a minimum contain the information as found in 6.8.

TABLE IX. Chest circumference for base vest.

Size	Chest Circumference (Inches)
X-Small	29-33
Small	33-37
Medium and Medium-Long	37-41
Large and Large-Long	41-45
X-Large and X-Large-Long	45-49
2-XLarge	49-53
3X-Large	53-57
4X-Large	57-61

3.8.2 Unique Identification (UID). Front and Back ballistic panels will require a unique identification label that conforms to the specifications below. The manufacturer is required to comply with the current versions of Military Standard 130 and the Department of Defense Guide to Uniquely Identifying Items, and the following criteria:

a) Color: Label/Tag will be black with white Human Readable and Machine Readable Information (HRI) and (MRI).

b) HRI shall consist of: Commercial and Government Entity (CAGE) code of activity applying the tag/label, Lot Number, Serial Number, Date of Production, National Stock Number (NSN) and Design Code. HRI will meet requirements of the latest version of MIL-STD-130.

c) MRI shall consist of one ECC 200 compliant Data Matrix code containing: CAGE code of activity applying the tag/label, Lot Number, Serial Number, Date of Production, NSN, and Design Code. The tag/label shall comply with the latest version of MIL-STD-130, ANSI MH10.8.2, and Items #4 and #5 below. To prevent automated read errors, the Government will not allow other 1D or 2D codes to be printed on this label. This does not restrict contractor from using other HRI and MRI on labels not associated with the UID label/tag.

d) Data Matrix Construct: The Data Matrix shall be encoded per MIL-STD-130 using only the data identifiers (DI) and criteria shown below. The following DI sequence shall be maintained in the order listed below:

   Cage=17V followed by cage code
   Lot=1T followed by lot number
   Serial number=S followed by serial number
   Date of production = 16D followed by production date, YYYYMMDD
   National stock number=N followed by the NSN.
   Part number = 1P followed by design code (the design code may be up to 13 alpha-numeric characters (plus only dashes “-” as special characters))

e) Construct Example:
   []>RS06GS17V52969GS1TE034GSS328185GS16D20080215GSN8470-01-520-7370GS1PABC-123RSEOT

f) Data Matrix Geometry: Data Matrix codes shall be a square ECC200 matrix per ISO 16022. Individual Cell size (element size) of the code shall be between 0.020 and 0.023 inches. A quiet zone of 0.5 inches of Black label/tag material is required around the Data Matrix code.

g) Verification: Data Matrix code quality will be graded to ISO 15415 with a certified verifier and meet a minimum passing grade per the latest release of MIL-STD-130. AS9132 and AIM DPM grading platforms will not be allowed for this project. Contractor must provide the contracting officer with at least two verification reports per ballistic panel for each FAT and LAT. If using laminates or overcoats the label must be verified after placing the laminate or overcoat on the label or tag. No exceptions are allowed. Proof of Verification is subject to inspection at the time of shipment.

h) Validation: Validation checks of the UID must be performed on a routine basis. Contractor is responsible for encoding the UID per above guidelines (#4 and 5) and the latest revision of MIL-STD-130. Proof of Validation is subject to inspection at the time of shipment.

i) Placement of the UID label will be printed on existing front and back ballistic insert label such that the label is extended no more than 3 inches in length below current size label.

3.8.3 Technical and operator manual. Vendors shall deliver a copy of TM 10-8470-209-10-PMC, or other documentation if further defined in the contract, with each end item delivered. The technical manual must be the latest version, including all changes, at the time of contract award.

3.8.4 Spare parts kit. Each production lot of IOTVs shall be accompanied by a spare parts kit. The parts kit shall contain the following items listed in table X and be stored in a high quality HDPE container consisting of a handle.

TABLE X. Spare parts kit.

Qty/kit	Description
20	Emergency release assembly (see 3.2.22)
20	Webbing hanger (see 3.2.17)
20	Female buckle, non-adjustable (see 3.2.18)
20	Female buckle, adjustable (see 3.2.19)
20	Male buckle, repairable (see 3.2.21)
20	Side plate carrier pocket

3.9 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.

3.9.1 Workmanship. The finished IOTV shall conform to the quality of product established by this specification. This is applicable to all components whether finished by the prime contractor and prime's subcontractors. Utmost care shall be taken during fabrication to ensure quality workmanship and safety of the service person using the item. Deviations in acceptable manufacturing procedures and/or quality of materials being used shall immediately be reported to the contracting officer or his designee. Except as otherwise specified herein, repairs are not allowed to be made to the IOTV.

3.9.2 Traceability. The contractor shall maintain traceability records for all component parts used to manufacture the end item product. When components are purchased as end item to the IOTV, all component parts Lot Identification shall be traceable via each IOTV's serial number and contract number. When purchased separately all component parts Lot Identification shall be traceable via the component part Lot Number. Subcontractor's Component part Lot information shall enable Traceability to the raw materials used in the Component part. Each IOTV lot shall consist of only one size. An IOTV lot can be made from multiple lots of ballistic material, where a lot of ballistic

material is defined as an individual roll of ballistic material. However, in the case where any additional ballistic material is left over from the production run of an IOTV lot, that material may only be used in the next consecutive IOTV lot. The contractor shall provide a technical description of the design package which shall include but not limited to built-sheet: design orientation, number of layers, and material identification by layer and material type by layer. Records shall be maintained and readily available for Government inspection and audit. For End Item Products identified with individual Serial Numbers, the Traceability requirements listed above shall be traceable via the individual serial number and contract number.

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 testing specified herein. The Government reserves the right to perform any of the tests set forth where such inspections are deemed necessary to ensure the supplies conform to prescribed requirements. All testing shall be performed at a Government directed test laboratory.

a) First article test (see 4.2)

b) Lot Acceptance/Conformance Inspection (see 4.3)

4.2 First article test. When a first article is required, it shall be examined for design (4.6), compatibility and interchangeability of components, inspection requirements in 4.7, ballistic data for all test conditions, data, certificate, or compliance for testing requirements in 4.9 and 4.10, and overall workmanship.

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.

4.3 Lot acceptance/conformance inspection. Conformance lot inspection shall be performed in accordance with paragraph 3 and 4. 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 and test such items to determine the validity of the certification. All certificates shall be supported by test reports to ascertain their validity.

4.4 Requirements and verifications. Table XI delineates performance requirements verified through visual methods, including physical measurements in order to determine that no deficiencies exist. The Government may elect to perform testing at their discretion at any time during production.

TABLE XI. Requirements and verifications.

CHARACTERISTIC	REQUIREMENT PARAGRAPH	VERIFICATION PARAGRAPH	FAT	LAT/ CONFORMANCE Lot Inspection
Materials and components	***3.2***	***4.5***		
Cloth, outer shell	3.2.1	4.5	X*	CoC
Cloth, inner shell	3.2.2	4.5	X*	CoC
Cloth, collar material	3.2.3	4.5	X*	CoC
Cloth, ballistic panel cover	3.2.4	4.5	X*	CoC
Webbing and Tapes	3.2.5	4.5	X*	CoC
Elastic	3.2.6	4.5	X*	CoC
Fasteners, hook and loop	3.2.7	4.5	X*	CoC
Snap Fasteners	3.2.8	4.5	X*	CoC
Foam	3.2.9	4.5	X*	CoC
Thread	3.2.10	4.5	X*	CoC
Thread, ballistic	3.2.11	4.5	X*	CoC
Polyethylene	3.2.12	4.5	X*	CoC
Grommet	3.2.13	4.5	X*	CoC
Washer	3.2.14	4.5	X*	CoC
Ladderloc	3.2.15	4.5	X*	CoC
D-ring	3.2.16	4.5	X*	CoC
Webbing hanger	3.2.17	4.5	X*	CoC
Female buckle, non-adjust	3.2.18	4.5	X*	CoC
Female buckle, adjust	3.2.19	4.5	X*	CoC
Male buckle, non-adjust	3.2.20	4.5	X*	CoC
Male buckle, repairable	3.2.21	4.5	X*	CoC
Emergency release assembly	3.2.22	4.5	X*	CoC
Groin Protector Attachment Clip	3.2.23	4.5	X*	CoC
Design	***3.3***	***4.6***		
Patterns	3.3.1	4.6.1 – 4.6.3	X	X
IOTV subsystem	3.3.2	4.6.4 – 4.6.5	X	X
Construction	***3.4***	***4.7***		
Hook and loop fastener	3.4.1	4.7.1	X	
Stitching	3.4.2	4.7.1	X	X
Automatic stitching	3.4.3	4.7.1	X	X
Bartacks	3.4.4	4.7.1	X	X
Bartack alignment	3.4.5	4.7.1	X	X
Buttonhole	3.4.6	4.7.1	X	X
Snap setting	3.4.7	4.7.1	X	X

CHARACTERISTIC	REQUIREMENT PARAGRAPH	VERIFICATION PARAGRAPH	FAT	LAT/ CONFORMANCE Lot Inspection
Binding	3.4.8	4.7.1	X	X
Operating requirements	***3.5***	***4.8***		
Camouflage	3.5.1	4.8.1	X*	CoC
Spectral reflectance	3.5.2	4.8.2	X*	CoC
Matching	3.5.3	4.8.3	X*	CoC**
Fungus resistance	3.5.4	4.8.4	X*	CoC
Functional integration	3.5.5	4.8.5	X*	X
SAPI pocket	3.5.5.1	4.8.5	X	X
Drag strap	3.5.6	4.8.6	X	N/A
Emergency release	3.5.7	4.8.7	X	X
Drainage	3.5.8	4.8.8	X	N/A
Ballistic material system operating requirements	***3.6***	***4.9***		
Areal Density	3.6.1	4.9.1	X	N/A
Thickness	3.6.2	4.9.2	X	N/A
Flexibility	3.6.3	4.9.3	X	N/A
Abrasion resistance	3.6.4	4.9.4	X	N/A
Ballistic performance requirements	***3.7***	***4.10***		
Fragmentation protection	3.7.1	4.10	X	X
Handgun protection	3.7.2	4.10	X	X
Support or ownership requirements	***3.8***	***4.11***		
Size, identification and instruction label	3.8.1	4.11.1	X	X
Unique identification (UID)	3.8.2	4.11.2	X	CoC

NOTES:

X - testing required
CoC - certificate of conformance to include data must be presented to DCMA during LAT pull.
* -individual subcomponent test reports from an approved test lab may be used for FAT submission. Test reports shall not be more than 12 months old at time of FAT commencement.
** - cloth, outer shell shall have shade verification conducted at a Government lab

4.5 Materials and components verification. The materials and components shall conform to applicable specifications, standards, and patterns required herein as stated in paragraph 3.2. Where manufacturer part numbers are called out, those parts or components shall be determined to be equivalent solely by the Government. During determination of equivalency, the Government reserves

the right to perform any of the inspections or testing set forth in this document where such inspections are deemed necessary to ensure the supplies conform to the prescribed requirements.

4.6 Design verification.

4.6.1 Finished measurements. The end items shall be inspected for finished measurements, Table XII. The lot size shall be expressed in units of vests or individual components.

TABLE XII. 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. Larger than nominal dimensional and applicable plus tolerance.	124	215
Component and Location Dimensions	Not within specified tolerance		216
Stitch Margin or Gage	Not within specified tolerance		217
Box, Box-X and stitching	Dimensions not within specified tolerance		218
Hardware	Not spaced within specified tolerance		219

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

4.6.1.1 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) 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.

b) Front and back width: The front and back width shall be taken on a straight line measuring the widest point below the lower armhole opening, edge to edge.

c) 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 horizontal webbing shall be measured on adjacent webbings from the bottom edge of one to the top edge of the other.

4.6.2 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 is noted, correction shall be made to the item or items affected. Parts that cannot be corrected shall be removed from the production.

4.6.3 In-process visual examination of ballistic filler assemblies for size. Table XIII provides visual examination criteria for ballistic filler. The lot shall be expressed in units of front or back ballistic fillers, groin protectors, lower back protectors, and collar assemblies. The sample unit shall be front and one back ballistic filler.

TABLE XIII. Visual examination of ballistic filler size.

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/		220
	(2) More than 3/8 inch at any point around the periphery 1/ 2/	125	
	(3) 1/8 inch up to 3/16 inch around entire periphery 2/		221
	(4) More than 3/16 inch around entire periphery 2/	126	
	B) larger than cutting pattern by 3/8 inch or more at any point 1/ 2/		222

*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.

4.6.4 Area of coverage. Square inches of coverage are measured by digitized patterns and comparison to working patterns. For First Article Testing one non-sewn mock up of each size yoke and collar assembly shall be provided for examination.

4.6.5 Weight. The IOTVs will be examined for weight by component. See max weights in Table I-A. Weights are taken on a tared scale and measured to the nearest 0.01 lb.

4.7 Construction verification.

4.7.1 End item visual inspection. The end items shall be inspected for the defects listed in table XIV. 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.

TABLE XIV. End item defects.

EXAMINE	DEFECT	CLASSIFICATION*	
		MAJOR	MINOR
Cloth	Any hole, cut, or tear.	101	
	Any abrasion marks, broken or missing yarns or multiple floats	102	
	Any mend, darn or patch.	103	
	Needle Chews.	104	
Webbing or Tape	Any hole, cuts, tears, or smash.	105	
	Not firmly and tightly woven, edges frayed or scalloped.	106	
	Multiple floats.		201
	Abrasion mark, slub, or broken end or pick.	107	
	Ends not fused as required.		202
Cabling	Any hole, cut or tear, incomplete securing of sleeve, impairing function.	108	
	Ends not finished as required.	109	
Fastener Tape	Any hole, cut or tear, hooks flattened, broken or missing, impairing function.	110	
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.	111	
	Clinched excessively tight, cutting material.	112	
	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.	113	
	Not specified style or type.	114	
	Splits is button or eyelet		203
	Finish omitted or not as specified.		204
Seams and Stitching:	Incorrect Style.	115	
Open Seams	0.5 inch or less.		205

	More than 0.5 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.	116	
Raw Edges	More than 0.5 inch when securely caught in stitching. NOTE: Raw edges not securely caught in stitching shall be classified as open seams.		206
Seam & Stitch Type	Wrong seam or stitch type.	117	
Stitch Tension	Tension loose, resulting in loose bobbin or top thread.		207
	Excessively tight, resulting in puckering of material.		208
Bartacks	Any bartack omitted.	118	
	Any bartack not as specified or not in specified location.		209
	Loose stitching, incomplete or broken.		210
Stitching Ends	Not secured as specified.		211
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.		212
Component & Assembly	Any area of ballistic filler bunched (i.e. does not lie flat)	119	
	Any component part omitted or not as specified (unless otherwise classified herein)	120	
	Needle Chews.	121	
	Any mend, darn, patch, holes, splice or other unauthorized repair.	122	
Location Markings	Printed marking more than 1/32 inch in width or not covered by component part.		213
Label	Missing, incorrect, illegible.	123	
Use & Care Pamphlet	Must be present with each IOTV		214

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

4.8 Operating requirements verification.

4.8.1 Camouflage. As specified by the contract the camouflage pattern shall be in accordance with their respective drawings.

4.8.2 Spectral reflectance. Spectral reflectance shall be evaluated initially and after laundering in accordance with Table IV. The three launderings shall be performed using AATCC 61 Test No. 1A; except a 4 gram sample size shall be used unless the amount needed to provide the required five layers of the specimen for testing is larger (the specimens of webbing or tape need to be 4 inches long). When evaluating the camouflage printed cloth, webbing, or tape each color shall be tested

separately. Also 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 unless the size of the item dictates a smaller aperture is required. When the measured reflectance values for any color at four or more wavelengths do not meet the limits specified in Table IV, it shall constitute a test failure.

4.8.3 Visual shade matching. The cloths shall 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 2856 ±200K.

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

4.8.5 Insertion demonstration. One barehanded person shall demonstrate insertion of the ESAPI into both front and rear IOTV pockets without tools or special aids. An insertion demonstration shall 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 (see paragraph 2.2.2). The examination shall be performed with an ESAPI in each pocket. The pocket flaps shall be closed and secured. The same demonstration procedure shall be conducted for side plate pockets using mock ESBI's conforming to drawing 2-6-270.

4.8.6 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 back pocket flap). The center of the drag strap shall be directly in line with the center of the load cell and pulling head. The drag strap shall be affixed to the load cell and pulling head through a loop of 2-in webbing (MIL-W-17337) having a gauge length of 9 ± 1 in. A preload of 1 lbf shall be applied prior to the start of testing. The load cell 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).

4.8.7 Emergency doffing. Each complete IOTV FAT or LAT sample shall be fitted to a standing manikin or test participant with SAPI and ESBIs and activated for emergency release. Activation shall be a firm quick pull approximately 45 degrees downward. If the vest does not doff it shall be noted as a major defect. If the vest doffs but one or two buckles do not release it shall be noted as a minor defect.

4.8.8 Drainage. The IOTV base vest shall be visually inspected for drain holes to ensure grommets are securely fastened and holes are not obstructed. Any missing or loose grommets/eyelets shall be noted as a defect.

4.9 Ballistic material system operating requirements verification.

4.9.1 Areal density. Areal density shall be measured to the nearest 0.01 pound per square foot in accordance with ASTM D-3776 for 5 randomly selected ballistic shoot packs submitted for FAT. The ripstop cover shall be removed prior to measurement. The average of the 5 shoot packs will determine if the requirement is met.

4.9.2 Thickness. Thickness shall be measured to the nearest 0.01 inch when tested according to ASTM D-1777, Table 1 testing option 1 for 5 randomly selected ballistic shoot packs submitted for FAT. The ripstop cover shall be removed prior to measurement. The average of the 5 the shoot packs will determine if the requirement is met.

4.9.3 Flexibility. The ballistic material system 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,fill = 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.

4.9.4 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 abradant shall be at least 1.5 inches wide and be cut in the warp or 0 degree orientation. The abraded specimen shall be visually examined and rated according to the following criteria. The final rating shall be determined by the average of the 5 test samples.

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.

4.10 Ballistic performance requirements verification.

4.10.1 Ballistic test criteria. For all protection ballistic limits (BL); V50, Vs/Vr, and V0 Conformance tests; the following minimum information shall be required 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. Strike velocity shall be used for ballistic requirements
i) PP (Partial Penetration) and CP (Complete Penetration) next to each shot velocity as determined.
j) Name of company performing tests.
k) Type of gun barrel, caliber, and propellant used
l) 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 paragraph 2.2), the data sheet should exclude the specific projectile used during testing.

4.10.2 Projectile velocity determination. Projectile velocity and time of flight measurements shall be in accordance with ITOP 4-2-805. Instrumental velocity shall be translated into strike velocity at the target and the strike velocity shall be used for ballistic requirements. 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 all projectiles, velocity correction methodology shall be used to calculate the actual striking velocity and, where appropriate, actual residual velocity.

4.10.3 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 ITOP 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.

4.10.4 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.

4.10.5 V50 ballistic limit calculation. The V50 is the average velocity of an equal number each of Complete Penetrations (C) and Partial Penetration (P) within a specified spread. V50 will be determined in accordance with MIL-STD-662F and ITOP 4-2-805. The V50 will be calculated using a 3 by 3 (3 lowest velocity C's and 3 highest velocity P's) within a 125-ft/s spread or a 5 by 5 within a 150-ft/s spread. The spread is calculated by subtracting the highest velocity used for the calculation from the lowest velocity used. If the 5 by 5 criteria cannot be met, then a logistic regression may be used to determine the V50 only if you have at least 5 C's and 5 P's. In addition, all shots must be used to calculate the V50 using logistic regression (for example, total 14 shots, 5 C, 9 P, and you cannot get a 5 by 5 within 150 fps all 14 shots must be used for the regression). For LAT only, when neither a 3 by 3, a 5 by 5 or a logistic regression can be used then a "7 Partial Rule" may be applied. The application of the "7 Partial Rule" requires 7 or more partial penetrations above the V50 requirement and no complete penetrations below the V50 requirement. The test item is said to have met the requirement, although a specific V50 velocity has not been determined.

4.10.6 C and P determination for V50. Complete and partial penetrations 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 paragraph 6.4).
b) IOTV Vest panels configured in the armor material system approved under the First Article 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 width 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 for FAT.
f) Shot spacing shall be measured on center of impact point on the strike face of the ballistic panel, not the surface of the vest.
g) All shots shall be at least 2.5 inches from any edge of the samples. When the size of a piece (yoke, collar, lower back protector) is too small to allow edge requirement to be met shots will be placed within 0.25" of the centerline of the piece to maximize impacted area. Spacing between shots must still be maintained for small pieces.
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. Closer shot spacing data shall be permitted in the event a failure does not occur.
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 on a firm flat surface.

4.10.7 V0 determination for acceptance. Instrumental velocity shall be translated into strike velocity at the target and the strike velocity shall be used for ballistic requirements. 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 paragraph 6.4).
b) IOTV Vest panels configured in the armor material system approved under the First Article shall be used for production lot testing.
c) Samples will be mounted on clay block (see paragraph 4.10.9).
d) The first shot will be 2.75 ± 0.25" inch from any edge.
e) The next shot shall be located 3.5 inch –0/+0.5" from the first shot and at the weakest 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 either previous test shot and tested at 30 degrees obliquity.
h) The transient deformation shall be measured (see paragraph 4.10.8) after the third and fifth valid test firings.
i) Test shots should be staggered at least 0.50 inch off the horizontal and vertical lines of any previous shots. Shot location will be measured as the impact point on the strike face of the ballistic panel, not the surface of the vest.
j) Test specimens shall be reconditioned to a smooth shape after every shot on a firm flat surface.

4.10.8 Transient deformation 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 occurs 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 44.0 mm. when measured from the original undisturbed surface of the backing material to the lowest point of the depression. The specimen may be smoothed between shots. BFD 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.

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. Deformations will be recorded in mm to the nearest tenth digit following standard ASTM E29 “Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications” (“Five even” rule)(Rounding Method) (i.e. 43.050 = 43.0, 43.051 = 43.1 and 47.950 = 48.0).

4.10.9 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.

4.10.10 Test continuation. For V0 testing any shot with a velocity over 1450 ft/s will be considered invalid. Testing will continue and subsequent shots will be considered valid as long as no striking velocity exceeds 1475 ft/s. If a shot exceeds 1475 ft/s the test will be considered a “no test”.

4.10.11 Environmental test conditions. All ballistic tests shall be performed in a standard atmosphere of 68 ±10 degree Fahrenheit and 50 ±20% relatively humidity. Temperature and humidity measurements shall be recorded before the beginning of each test.

4.10.11.1 Wet condition. The wet condition is achieved by completely submerging the ballistic material system in sea water (formulation shall be 3% sodium chloride/0.5% magnesium chloride) at 70 ±10 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 after the first shot.

4.10.11.2 Temperature extremes condition. For hot temperature extreme, the ballistic material system shall be heated in an oven operating at 155 + 10 degrees Fahrenheit for 6 ± 0.25 hours continuously. The test specimen shall be removed from the oven, mounted and ballistically tested as specified in 4.10.6. For cold temperature extreme, the test specimen shall be cold temperature exposed to -60 ±10 degree F for 6 ±0.25 hours continuously. The test specimen shall be removed from refrigeration, mounted and ballistically tested as specified in 4.10.6, within 10 minutes with tests completed within 60 minutes after the first shot. If the test is not completed within 60 minutes the specimen shall be reconditioned for at least 1 hour at the temperature specified above.

4.10.11.3 Accelerated aging. Accelerated aging for the ballistic material system will be performed in general accordance with ASTM D 1149, with the following modifications. The ballistic material system under test will be subjected to treatment. All tested components will be conditioned for 72 hours at 40^{o}C while maintaining a minimum of 50 parts per hundred million of ozone. The IOTV and/or subcomponents do not require any additional tensile strain during accelerated aging conditioning. After accelerated aging conditioning, the IOTV and/or subcomponents under test must remain at ambient atmospheric conditions for a minimum of 24 hours prior to ballistic testing, not to exceed 48 hours from completion of conditioning. Verify that the conditioned specimens perform as specified in 3.7.1.

4.10.11.4 POL contamination. The ballistic material system shall be immersed in each of the following; motor oil, and JP8 at room temperature. The specimens shall be placed flat in a pan with 0.125 to 0.25 inch 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 -0/+15 mins 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. Before mounting in the test fixture, the sample may be contained in a resealable plastic bag and mounted to the test fixture to limit exposure to contaminants and fumes. The specimen then shall be ballistically tested within 30 minutes, with testing completed within 60 minutes after the first shot. 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.

4.11 Support or ownership requirements verification.

4.11.1 Size, identification, and instruction label. The labels shall be verified in accordance with section 3.8.1 and MIL-DTL-32075 type IV, Class 14.

4.11.2 Unique identification (UID). Shall be verified in accordance with paragraph 3.8.2 and MIL-STD-130

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 IOTV 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. IOTV protection is increased to protect vital organs from multiple hits against small arm rifles and indirect fire flechette when front and back 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, and pre-production items are required.
c) Camouflage and solid colors required.
d) Size Tariff
e) Contractually approved ballistic package(s) to include package name, complete description, and FAT acceptance letter.
a) Shipping instructions

6.3 Standard sample. For access to standard samples, contact the procuring activity issuing the invitation for bid.

6.4 Simulant/surrogate shoot-pack. A simulant/surrogate shoot-pack system of IOTV body armor may be used to represent the ballistic resistant materials of the IOTV. All surrogate shoot pack systems will 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 IOTV base vest will be 15 x 15 inches in size consisting of X plies proposed ballistic material system used in IOTV base vest. 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 (not to include the rip stop outer cover). 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 IOTV yoke will be 15 x 15 inches in size consisting of X plies proposed ballistic material system used in IOTV yoke. 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 face fabric and the pocket cover will consist of 500 Denier Cordura Type III, Class III in accordance with GL/PD 10-07. 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 will consist of 500 Denier Cordura Type III, Class 3 in accordance with GL/PD 10-07. The front and back filler carrier covers 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.

6.5 Ballistic testing definitions. MIL-STD-3027 shall be used as definition references only. In the case of a conflict between MIL-STD-3027 and this document, this purchase description shall take precedence. The following definitions are provided to assist in understanding the test procedures:

Fair Impact.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 (P). Any fair impact that is not a complete penetration shall be considered a partial penetration.

Complete Penetration (C) 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 (C) 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 theclay 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.

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.

6.6 First article test protocol. A total of 44 shoot packs and 33 yoke packs built in accordance with section 6.4, 2 complete IOTVs of each size, and cut unsown components per size shall be submitted when a full FAT is required (NOTE: if multiple sub-contractors are to be utilized on the IOTV construction then complete samples must be sent per contractor and be clearly labeled). All FAT samples must be accompanied with a DD1222 signed by DCMA. In addition, a 3-ring binder containing final test reports for all materials and components called out in section 3.2 of the purchase description shall be submitted. All test reports shall be no older than 12 months at the time of submission. If testing has not been completed on any components called out in section 3.2, then it will be evaluated during FAT. The ballistic design will be tested in accordance with section 4.9 and 4.10 using the test matrix in Table XV. All shoot packs to be used shall be measured for thickness and areal density prior to testing. NOTE: 17 grain V50 for yoke is tested with and without a base vest.

TABLE XV. First article test matrix, ballistic.

TEST	Frag 2gr	Frag 4gr	Frag 16gr	Frag 64gr	Frag 17gr	9mm Handgun	NEED
V50, dry, 0°	X	X	X	X	X	X	6 shoot packs 6 yoke packs (frag only)
V50, wet, 0°	X	X	X	X			4 shoot pack 4 yoke packs
V50, dry, 45°	X	X	X	X			8 shoot pack 8 yoke pack
V50, high T			X				1 shoot pack
V50, low T			X				1 shoot pack
V50, aging			X				1 shoot pack
V50, POL oil			X				1 shoot pack
V50, POL JP8			X				1 shoot pack
V0						X	1 shoot pack
V_s/V_r, 0°	X	X	X	X			4 shoot pack 4 yoke pack
V_s/V_r, 45°	X	X	X	X			8 shoot pack 8 yoke pack
Contingency							13 shoot pack 9 yoke pack
Total							49 shoot pack 39 yoke pack

6.7 Lot acceptance/conformance inspection protocol. Complete IOTVs from a finished production lot shall be randomly selected by DCMA for lot acceptance testing (LAT). The quantities required are listed in Table IA-B for complete IOTVs and modular components depending on lot

size. All LAT samples must be accompanied with a DD1222 signed by DCMA. The ballistic design will be tested in accordance with section 4.9 and 4.10 using the test matrix in Table XVI-A. All ballistic panels shall be inspected for ballistic configuration (ply count). NOTE: Each IOTV consists of one front panel and one back panel. The panels should be alternated for different threats. For example, first IOTV sample, front panel should be tested for 17gr. V50, and the back panel should be tested for 9mm V0; the second IOTV sample, front panel should be tested for 9mm V50, the back panel should be tested for 17 gr. V50, and so on. For lots which include complete IOTVs, one V50 per component shall be required. For lots that are pure components (ex. 100% groin), then the test matrix in Table XVI-B shall be used.

TABLE XVI-A. Lot acceptance test sample selection matrix, complete IOTV.

Lot size	Number of test panels per threat			Total Samples	Contingency	Total Vests
	V50, 17 gr	V50, 9mm	V0, 9mm			
26 to 150	2	2	2	6	1	4
151 to 1200	4	4	4	12	1	7
1201 to 3200	6	6	6	18	1	10

TABLE XVI-B. Lot acceptance test sample selection matrix, modular components.

Lot size	Number of Test Samples Required for 17gr. V50[3]					V50 Tests per component[2]
	Deltoid	Groin	Lower back	Yoke[1]	Collar	
26 to 150	4	4	4	8	8	1
151 to 1200	8	8	8	16	16	2
1201 to 3200	12	12	12	24	24	3

Footnotes:

1. Yoke will be tested in conjunction with the base vest. Base vest will be the strike face and will be placed in front of the yoke during testing. When no base vest is present (a pure yoke and collar lot) then the yoke will be tested standalone with 17 grain V50 requirement of 1120 feet per second (section 3.7.1 of purchase description).

2. Multiple test panels may be necessary to calculate V50 in accordance with paragraph 4.10. If these requirements are not met using the first panel, subsequent panels may be used and combined until the number of valid data points is reached.

3. Number of test panels listed above is the total quantity of end items needed per lot. If complete vests are shipped for lot acceptance testing, these components may be removed from complete vest and used for the modular component testing. Only one V50 will be required for separate components for LAT when included with base vest in the test report.

6.8 Contents of labels, and use and care instructions. Samples are below.

IMPROVED OUTER TACTICAL VEST
FRONT CARRIER – FQ/PD 07-05 G
SIZE:
NSN:

THE IMPROVED OUTER TACTICAL VEST (IOTV) 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.

REFER TO USE & CARE MANUAL FOR THE PROPER USE OF THIS BALLISTIC PROTECTIVE SYSTEM, REPAIR PROCEDURES & RECORDING OF HITS.

LOT NUMBER:_____
DATE OF MFG:_____
SERIAL NO:_____
CONTRACT #:
MANUFACTURED BY:

IMPROVED OUTER TACTICAL VEST
BACK CARRIER – FQ/PD 07-05 G
SIZE:
NSN:

THE IMPROVED OUTER TACTICAL VEST (IOTV) 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.

REFER TO USE & CARE MANUAL FOR THE PROPER USE OF THIS BALLISTIC PROTECTIVE SYSTEM, REPAIR PROCEDURES & RECORDING OF HITS.

LOT NUMBER:_____
DATE OF MFG:_____
SERIAL NO:_____
CONTRACT #:
MANUFACTURED BY:

IMPROVED OUTER TACTICAL VEST - FRONT BALLISTIC INSERT– FQ/PD 07-05 G
SIZE:
NSN:

INSERT THIS SIDE TO BODY FAILURE TO INSERT THIS BALLISTIC INSERT IN THE IOTV 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.

LOT NUMBER:_____
DATE OF MFG:_____
SERIAL NO:_____
CONTRACT #:
MANUFACTURED BY:

IMPROVED OUTER TACTICAL VEST- BACK BALLISTIC INSERT– FQ/PD 07-05 G
SIZE:
NSN:

INSERT THIS SIDE TO BODY FAILURE TO INSERT THIS BALLISTIC INSERT IN THE IOTV 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.

LOT NUMBER:_____
DATE OF MFG:_____
SERIAL NO:_____
CONTRACT #:
MANUFACTURED BY:

IMPROVED OUTER TACTICAL VEST
SIDE PLATE CARRIER – FQ/PD 07-05 G
SIZE:
NSN:

Refer to IOTV outershell label for cleaning and maintenance instructions.

LOT NUMBER:_____
DATE OF MFG:_____
CONTRACT #:
MANUFACTURED BY:

IMPROVED OUTER TACTICAL VEST
SIDE PLATE POCKET – FQ/PD 07-05 G
SIZE:
NSN:

Refer to IOTV outershell label for cleaning and maintenance instructions.

LOT NUMBER:_____
DATE OF MFG:_____
CONTRACT #:
MANUFACTURED BY:

IMPROVED OUTER TACTICAL VEST
YOKE/COLLAR FRONT ASSEMBLY – FQ/PD 07-05 G
NSN:
Refer to IOTV outershell label for cleaning and maintenance instructions.

LOT NO:_____
DATE OF MFG:_____
SERIAL NO:_____
CONTRACT #:
MANUFACTURED BY:

IMPROVED OUTER TACTICAL VEST
YOKE/COLLAR BACK ASSEMBLY – FQ/PD 07-05 G
SIZE:
NSN:
Check to insure the correct side of the Ballistic Panel will be against the Body before attaching to the IOTV.Refer to IOTV outershell Label for cleaning and maintenance instructions.
LOT NO:_____
DATE OF MFG:_____
SERIAL NO:_____
CONTRACT #:
MANUFACTURED BY:

IMPROVED OUTER TACTICAL VEST
LOWER BACK PROTECTOR OUTERSHELL – FQ/PD 07-05 G
NSN:

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

LOT NUMBER:_____
DATE OF MFG:_____
SERIAL NO:_____
CONTRACT #:
MANUFACTURED BY:

IMPROVED OUTER TACTICAL VEST
LOWER BACK PROTECTOR INSERT – FQ/PD 07-05 G
NSN:
INSERT THIS SIDE TO BODY
DO NOT LAUNDER. Remove loose dirt from cover with a cloth or soft brush. Avoid submerging panels in wash water. DO NOT bleach. DO NOT machine wash. DO NOT dry clean. DO NOT apply solvents. Refer to the IOTV outershell Label for cleaning and maintenance instructions.
LOT NUMBER:_____
DATE OF MFG:_____
SERIAL NO:_____
CONTRACT #:
MANUFACTURED BY:

IMPROVED OUTER TACTICAL VEST
GROIN PROTECTOR OUTERSHELL – FQ/PD 07-05 G
SIZE:
NSN:

Check to insure the correct side of the Ballistic Panel will be against the Body before attaching to the IOTV. Refer to IOTV outershell Label for cleaning and maintenance instructions.
LOT NUMBER:_____
DATE OF MFG:_____
SERIAL NO:_____
CONTRACT #:
MANUFACTURED BY:

IMPROVED OUTER TACTICAL VEST
GROIN PROTECTOR INSERT – FQ/PD 07-05 G
SIZE:
NSN:
INSERT THIS SIDE TO BODY
DO NOT LAUNDER. Remove loose dirt from cover with a cloth or soft brush. Avoid submerging panels in wash water. DO NOT bleach. DO NOT machine wash. DO NOT dry clean. DO NOT apply solvents. Refer to the IOTV outershell Label for cleaning and maintenance instructions.
LOT NUMBER:_____
DATE OF MFG:_____
SERIAL NO:_____
CONTRACT #:
MANUFACTURED BY:

IMPROVED OUTER TACTICAL VEST
DELTOID PROTECTOR OUTERSHELL – FQ/PD 07-05 G
SIZE:
NSN XXXX-XX-XXX-XXXX

Refer to the IOTV outershell Label for cleaning and maintenance instructions.

LOT NUMBER:_____
DATE OF MFG:_____
SERIAL NO:_____
CONTRACT #:
MANUFACTURED BY:

DELTOID PROTECTOR INSERT – FQ/FD 07-05 G
SIZE:
NSN:
INSERT THIS SIDE TO BODY
DO NOT LAUNDER. Remove loose dirt from cover with a cloth or soft brush. Avoid submerging panels in wash water. DO NOT bleach. DO NOT machine wash. DO NOT dry clean. DO NOT apply solvents. Refer to the IOTV outershell Label for cleaning and maintenance instructions.
LOT NUMBER:_____
DATE OF MFG:_____
SERIAL NO:_____
CONTRACT #:
MANUFACTURED BY: