

INCH-POUND

MIL-DTL-87174A(USAF)

30 October 1998

SUPERSEDING

MIL-H-87174(USAF)

25 October 1983

DETAIL SPECIFICATION

HELMET, FLYER'S HGU-55/P

This specification is approved for use by the Department of the Air Force and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the requirements for the HGU-55/P flyer's helmet.

1.2 Classification. The helmets are provided in the following sizes as specified (see 6.2).

Medium
M

Large
L

Extra Large
XL

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. 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 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be of use in improving this document should be addressed to: Technology & Industrial Services Division, SA-ALC/TILDD, 485 Quentin Roosevelt Rd, Kelly AFB, Texas 78241-6425, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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SPECIFICATIONS

FEDERAL

A-A-52094	-	Thread, Cotton
KK-L-254	-	Leather, Sheepskin, Chrome Tanned

DEPARTMENT OF DEFENSE

MIL-A-5540	-	Adhesive, Polychloroprene
MIL-C-83409	-	Coating, Visor, Polycarbonate, Flying Helmet
MIL-PRF-85285	-	Coating: Polyurethane, High-Solids
MIL-P-9400	-	Plastic Laminate and Sandwich Construction Parts, Aircraft Structural, Process, Specification for
MIL-P-25421	-	Plastic Materials, Glass Fiber Base-Epoxy Resin, Low Pressure Laminated
MIL-M-87163	-	Mask, Oxygen, MBU-12/P
MIL-V-43511	-	Visor, Flying Helmet, Polycarbonate

STANDARDS

FEDERAL

FED-STD-595	-	Colors Used in Government Procurement
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(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Defense Automated Printing Service, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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.

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DRAWINGS

AIR FORCE

60B4278	-	Retainer, Jack
64A2217-4		Earcup set
68H274	-	Helmet Shell, Flying, HGU-22/P Assembly of
70360	-	Absorbent Liner Assembly
7136036	-	Headset-Electrical, H-154A/A1C, Assembly
79B4402	-	Bag, Lens
79B4695	-	Pile Fastener Ear Section
80C4782	-	Chin Strap, Subassembly
80C4784	-	Nape Strap, Subassembly, Universal
81B5370	-	Lens, Stop Subassembly
81D5189	-	Visor Assembly, Lightweight (MBU-12/P Trim)
81D5330	-	Helmet Assembly, HGU-55/P
81D5332	-	Helmet Shell, Medium
81D5333	-	Helmet Shell, Large
81D5334	-	Helmet Shell, X-Large
81D5335	-	Patterns, Edgeroll
82A5614-10	-	Bayonet Receiver Kit
82C5701	-	Cover Lens Assembly
84D6838	-	Layer Assy, HGU Series

U. S. ARMY NATICK RESEARCH, DEVELOPMENT, AND ENGINEERING CENTER

4-1-54	-	Buckles, Tongueless and Web Strap; Buckles – 1 Bar, Type I – 2 Bar, Type 2
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2.3 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of the documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI)

ANSI Z90.1 Headgear Protective for Motor Vehicular Users Specifications for.

(Application for copies should be addressed to the American National Standards Institute, 11 West 42nd St. New York, NY 10036.)

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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 Qualification. The HGU-55/P helmets furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.3 and 6.4).

3.2 Materials. The materials used in the fabrication and assembly of the helmet components shall comply with the requirements of specifications referenced on the applicable drawings and as specified herein.

3.2.1 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the materials meet or exceed the operational and maintenance requirements and promote economically advantageous life cycle cost.

3.2.2 Shell. The shell shall be a fiberglass cloth and epoxy resin laminate in accordance with MIL-P-25421, Type I, Class 1, laminate cloth base number 181 or 181-150. The shell shall be comprised of 5 plies of reinforcing material that overlap at the centerline. The shell shall be a semi-void-free laminate and shall contain no defects which exceed those defined under 3.6 of MIL-P-9400. The molded shell shall conform in shape, contour and thickness to 81D5332 for the size medium; 81D5333 for the size large; and 81D5334 for the size extra-large. The thickness of the shell shall be within a range of 0.035 to 0.050 inch, except that a maximum thickness of 0.095 inch shall be permitted in the area of the laminate where reinforcing material is overlapped.

3.2.3 Fastener pile fabric. The fastener pile fabric used for earcup retention shall be in accordance with Drawing 79B4695.

3.2.4 Edgeroll. The leather used in the edgeroll shall be sheepskin in accordance with KK-L-254, Type A, Class 1, Subclass A. The foam core used in the edgeroll shall be polyurethane foam (see 6.8). The density shall be 3.5 to 5.0 pounds per cubic foot. The adhesive used in the installation of the edgeroll shall be consistent with Class 2, 3, or 5, Neutral Form A or B of MIL-A-5540 (see 6.8). The thread used in the installation of the edgeroll shall be unbleached or white color, and the size and type consistent with A-A-52094.

3.2.5 Energy Absorbing Liner. The energy absorbing liner shall be fabricated from expandable polystyrene plastic foam having a density of 2 - 2.5 pounds per cubic foot (see 6.8). The inner surface (concave side) of the liner shall be coated with white shellac or water thinned white latex coating which will not collapse, soften, or visibly affect the foam structure and which will form a base for adhesion of the fastener tapes to the liner.

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3.3 Design and construction. The helmet and its components shall be constructed in accordance with Drawing 81D5330, the subsidiary drawings listed below and their detail drawings, and the requirements specified herein.

DRAWINGS	COMPONENTS
79B4695	Pile Fastener Ear Section
80C4782	Chin Strap, Subassembly
80C4784	Nape Strap, Subassembly, Universal
81B5370	Lens Stop Device
81D5332	Helmet Shell, Medium
81D5333	Helmet Shell, Large
81D5334	Helmet Shell, X-Large
81D5335	Patterns. Edgeroll

3.3.1 Visor hardware. The flanged nuts with washers shall be installed in the visor mounting holes as shown on Drawing 68H274.

3.4 Performance.

3.4.1 Shell finish adhesion. The shell finish coating shall adhere to the shell during normal use.

3.4.2 Heat exposure. The helmet assembly shall not change in weight by more than 1 percent, nor shall there be a change in distance between the shell center reference dimples greater than 0.25 inch. No other changes affecting appearance or serviceability and no visible distortion of the components shall take place as a result of the heat exposure of up to 160 ± 27 °F.

3.4.3 Penetration resistance. The helmet shell shall withstand an impact of a pointed, 16-ounce steel bob freely dropped from a height of 10 feet. The bob shall have a point having a maximum radius of 0.015 inches. Penetration shall be less than 0.25 inches when measured from outside the helmet shell.

3.4.4 Impact protection. When an impact of 35 foot-pounds energy is applied to the helmet assembly, acceleration experienced by the headform shall not exceed 150g for more than 6 milliseconds, 200g for 3 milliseconds, or 400g.

3.4.5 Windblast protection. The complete helmet assembly shall not loosen or tear away from the headform or break during windblast of 450 ± 20 kt.

3.4.6 Fastener tape bond. All fastener tapes shall remain bonded to the liner over at least 75% of their total area when tested as specified in 3.2.5

3.5 Components used with the HGU-55/P helmet. When procured as part of the HGU-55/P helmet acquisition (see 6.2), the listed components shall meet the requirements specified herein and shall compose a complete assembly.

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3.5.1 Buckles and thread. Buckles shall be a 2-bar design, 0.75 inches wide, and constructed of brass. See Drawing 4-1-54. The buckles shall have a black chemical finish applied in accordance with established commercial practices (see 6.8). The thread shall be nylon, size 1, black, general purpose, twisted multiple cord (ply) construction, bonded or unbonded with a soft finish. Each of the individual yarns shall be twisted initially with not less than 6.0 turns per inch (tpi), and in the opposite direction to the final twist. The final plied twist shall be not less than 6.0 tpi. The thread size parameters shall be in accordance with table I.

TABLE I. Thread Sizes.

Thread Size	Ply	Final Twist (t.p.i.)	Nominal Tex Number (g/km)	Length per pound (yards)	Breaking force minimum pounds	Elongation percent maximum
1	3	6.0	68 – 76	5,801 - 8,700	9	26
2	2 or 3	7.0	46	8,701 - 13,000	6	26

3.5.2 Visors.

3.5.2.1 Visor lens coating. The visor lens shall be polycarbonate with optical characteristics in accordance with MIL-V-43511. The visor lens shall be coated on the front and rear surfaces with an abrasion resistant coating in accordance with MIL-C-83409.

3.5.2.2 Visor assembly, lightweight (Clear - MBU-12/P Trim). The lightweight visor assembly (Clear - MBU 12/P Trim) shall be in accordance with Drawing 81D5189-3.

3.5.2.3 Visor assembly, lightweight (Neutral Gray - MBU-12/P Trim). The lightweight visor assembly (Neutral Gray - MBU-12/P Trim) shall be in accordance with Drawing 81D5189-4.

3.5.3 Headset assembly. The H-154A/A1C headset assembly shall be in accordance with Air Force Drawing 7136036 except that the color of the earcup, earseal, and earcup inserts shall be black.

3.5.4 Absorbent liner. The absorbent liner shall be in accordance with Drawing 70360. The fabric used in the construction of the absorbent liner shall be preshrunk prior to cutting and stitching, shall be knitted simplex, Type I, and shall be gray. The thread used in the construction of the absorbent liner shall be size 2, nylon, general purpose twisted multiple cord (ply) construction, unbonded with a soft finish. Each of the individual yarns shall be twisted initially with not less than 7.0 t.p.i., and in the opposite direction to the final twist. The final plied twist shall be not less than 7.0 t.p.i. The thread size parameters shall be in accordance with table I.

3.5.5 Retainer jack. The retainer jack shall be in accordance with Drawing 60B4278.

3.5.6 Pad set, fittings, earcup. The pad set, fittings, and earcup shall be in accordance with Drawing 64A2217-4.

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3.5.7 Bayonet receiver kit. The bayonet receiver kit shall be in accordance with Drawing 82A5614-10.

3.5.8 Lens bag. The lens bag shall be in accordance with Drawing 79B4402.

3.5.9 Visor lens cover. The visor lens cover shall be in accordance with drawing 82C5701.

3.6 Finish and color. The molded shell shall be trimmed to the specified edge contour and all holes cleanly punched or drilled at the required locations. All flash shall be removed. The exterior surface shall be cleaned and smooth. The edge shall be sanded to remove sharp surfaces. The exterior surface shall be primed and then coated with a polyurethane paint in accordance with MIL-PRF-85285 that will meet the adhesion requirements when tested in accordance with 4.5.5. After drying, the paint finish shall be smooth.

3.6.1 Molded shell. The color of the molded shell shall be gray conforming to 36231 of FED-STD-595.

3.6.2 Leather. The leather used in the edgeroll shall be lusterless gray conforming to 26132 of FED-STD-595.

3.7 Identification of product. Each helmet assembly and components shall be identified in accordance with the contract (see 6.2).

3.8 Weight. The weight of the complete helmet assembly, consisting of the painted shell, thick leather edgeroll, buffer leather, lens stop devices, fastener pile fabric and snap fasteners (for visor lens attachment), shall not exceed 1.05 lbs. (475 grams) for size medium, 1.18 lbs. (535 grams) for size large and 1.27 lbs. (575 grams) for size extra large.

3.9 Workmanship. All components, parts, and equipment shall be constructed and assembled in accordance with commonly accepted industrial workmanship standards.

4. VERIFICATION

4.1 Classification of inspection. The testing requirements specified herein are classified as follows:

- a. Qualification inspection (see 4.3)
- b. Quality conformance inspection (see 4.4)

4.2 Inspection conditions.

4.2.1 Atmospheric conditions. Unless otherwise specified in the individual test, all tests shall be performed at ambient pressure, at a temperature of $77^{\circ}\text{F} \pm 14.5^{\circ}\text{F}$, and at a relative humidity of 70% or less.

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4.2.2 Items required for windblast test. The following items are required in conducting the windblast test:

- a. Mask, Oxygen MBU-12/P (MIL-M-87163)
- b. Bayonet Receiver Kit (Drawing 82A5614-10)
- c. Visor Assembly, Lightweight, MBU-12/P (Drawing 81D5189)
- d. Thermal Plastic Liner (TPL), P/N 84D6838
- e. Headform (see 6.7)

4.3 Qualification inspection.

4.3.1 Qualification test samples. The qualification test samples shall be representative of the production equipment and shall be identified with the manufacturer's part number and such other information as required by applicable drawings.

4.3.1.1 HGU-55/P helmet assemblies. Unless otherwise modified by the contract or by the procuring activity (see 6.2), qualification test samples shall be as follows:

- a. Sample A:
 - (1) One chin strap assembly with installation hardware (Drawing 80C4782).
 - (2) One nape strap assembly with installation hardware (Drawing 80C4784).
 - (3) One molded shell of each size, trimmed and drilled, painted, and without edgeroll (Drawings 81D5332, 81D5333, and 81D5334).
- b. Sample B: Two helmet assemblies of each size specified on the contract or purchase order that are completely finished and assembled in accordance with this specification and Drawing 81D5330.
- c. Sample C: Two helmet assemblies of each size specified on the contract or purchase order that are completely finished and assembled in accordance with this specification and Drawing 81D5330.
- d. Sample D: Four HGU-55/P helmet assemblies that are completely assembled in accordance with this specification and Drawing 81D5330. The size of these helmets may be medium or large depending upon the size of the windblast test headform required in the conduct of the test.
- e. Sample E: Two HGU-55/P helmet assemblies that are completely assembled in accordance with this specification and Drawing 81D5330.
- f. Sample F: Two HGU-55/P helmet assemblies that are completely assembled in accordance with this specification and Drawing 81D5330.
- g. Sample G: Two HGU-55/P helmet assemblies of each size, consisting of components listed in 3.8.

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- h. Sample H: When procured as part of the HGU-55/P helmet acquisition (see 6.2), one each of the following components.

- (1) Visor Assembly, Lightweight (Neutral Gray - MBU-12/P Trim)
- (2) Headset, Electrical H-154/A1C Assembly
- (3) Absorbent Liner Assembly, Medium or Large
- (4) Retainer Jack
- (5) Pad Set, Fittings, Earcup
- (6) Bayonet Receiver Kit
- (7) Cover Lens Assembly
- (8) Lens bag

4.3.2 Qualification testing. The qualification test samples shall be subjected to the tests listed in table II.

TABLE II. Qualification tests.

Test Sample	Characteristic	Requirement Paragraph	Test
A	Materials	3.2	4.5.1
A	Design and construction	3.3	4.5.1, 4.5.2, 4.5.4
B	Shell finish adhesion	3.4.1	4.5.5
B	Liner adhesion compatibility	3.4.8	4.5.13
C	Heat exposure	3.4.2	4.5.6
D	Windblast protection	3.4.5	4.5.9
E	Impact protection	3.4.4	4.5.8
F	Penetration resistance	3.4.3	4.5.7
G	Weight	3.8	4.5.12
H	Dimensional examination	3.3, 3.5	4.5.1, 4.5.2
I	Visor lens optical characteristics	3.5.2.1	4.5.10
J	Coating abrasion resistance	3.5.2.1	4.5.11

4.4 Quality conformance inspection. Quality conformance inspections shall consist of the individual tests specified herein. Lot sizes shall be specified by the procuring activity (see 6.2).

4.4.1 Individual tests. Each helmet assembly and associated components, if applicable, shall be subjected to the following tests:

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- a. In-process examination (see 4.5.3).
- b. Visual examination of molded, unpainted shell (see 4.5.3.1).
- c. Visual examination of painted shell prior to installation of edgeroll (see 4.5.3.2).
- d. End-item visual examination (see 4.5.4).

4.4.2 Sampling plans. Unless otherwise specified, sampling plans shall conform to an accepted commercial sampling standard (see 6.2 and 6.8).

4.4.2.1 Sampling plan A. The items specified in table III shall be subjected to the dimensional examination of 4.5.2.

TABLE III. Sample unit for dimensional examinations.

Component	Sample Unit
Molded shell, unpainted	1
Chin strap assembly	1
Nape strap assembly	1
Pad set, fitting, earcup	1
Absorbent liner, each size	1
Visor lenses - MBU-12/P (Neutral Gray)	1
Bayonet receiver kit	1
Lens cover	1
Lens bag	1

4.4.2.2 Sampling plan B. The items listed in 4.5.3.3 shall be subjected to visual examination.

4.4.2.3 Sampling plan C. Helmet assemblies from each lot shall be subject to the following tests.

- a. Shell finish adhesion (see 4.5.5)
- b. Heat exposure (see 4.5.6)
- c. Penetration resistance (see 4.5.7)
- d. Impact protection (see 4.5.8).

4.4.2.4 Sampling plan D. Helmet assemblies of each size, assembled in accordance with 3.9 shall be taken from each lot and subjected to examination for the weight as specified in 3.8.

4.4.3 Common hardware. The common hardware such as screws, nuts, washers, eyelets, and grommets used in the fabrication and assembly of the helmet shell components shall be inspected in accordance with their applicable drawings and specifications.

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4.5 Tests.

4.5.1 Materials and hardware examination. The materials and hardware used in the fabrication and assembly of the HGU-55/P helmet, and if applicable, the used-with components (see 3.5), shall be examined to determine compliance with the requirements of applicable specifications, standards, and drawings.

4.5.2 Dimensional examination of molded shell. The dimensional examination of the unpainted molded shell shall be in accordance with applicable drawings and the following shall be checked:

- a. All hole sizes and location dimensions.
- b. Shell thickness at four random locations along the edge contour and at six widely scattered locations along each half of the shell (right and left). The average thickness of the 10 locations shall be within the limits specified in 3.2.2.
- c. Overall shell width at the center references dimples and the overall shell height at butt-line 0.00 on Drawing 81D5332 for size medium, Drawing 81D5333 for size large, and Drawing 81D5334 for size extra-large. Each dimension shall be within 0.25 inches of the specified total.
- d. The overall shell width at the front edge contour at the following specified water lines. Each dimension shall be within 0.25 inches of the specified total.

Size medium:	water line 1.50 and 3.50
Size large:	water line 1.00 and 3.00
Size extra large:	water line 1.00 and 3.00

4.5.3 In-process examination. Visual inspections shall be made during the manufacturing process for defects as specified in table IV.

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TABLE IV. In-process visual examination - noted problems.

<u>Molded shell, unpainted</u> ,blisters or delamination
<u>Helmet shell</u> Shell visibly warped or distorted Color not uniform over total surface Gloss of finish different than standard color chip Orange peel, runs, or sags in paint Scratches, scuffed, or abraded areas Fitting holes, incorrect location or size
<u>Visor, assembly lightweight</u> Edge bead not securely adhered to visor Pile fastener not securely adhered to visor Tears, cracks, or holes in beading Buckle missing Snap fastener component missing Snap fastener incorrectly set Loose stitching, skipped stitches or not back stitched Webbing routed through buckles correctly Ends of webbing not seared Attaching rivets correctly installed Material not as specified Identification label missing or illegible
<u>Lens covers, visor</u> Materials not as specified Loose stitching, skipped stitches or not back stitched Color not as specified
<u>Absorbent liner assembly</u> Material not as specified Loose stitching, skipped stitches or not back stitched Incorrect size marked Any hole, tear or soiled areas
<u>Pads, fitting earcup</u> Hook or pile fasteners not secured properly

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TABLE IV. In-process visual examination - noted problems - Continued.

<u>Chin strap or nape strap</u> Material not as specified Any grommet incorrectly installed Snap fastener insecurely set Loose stitching, skipped stitches, or not back-stitched Ends of webbing not seared Lacing cord not seared properly Lacing cord improperly laced Buckle tab missing
<u>Energy Absorbing Liner</u> Liner not properly aligned in shell Any gaps between liner and shell exceeding 0.125 inch Inner surface of liner not coated Any fastener tape missing Centerline beads not discernible Size code letter not discernible Liner not uniformly bonded to shell Soiled or stained areas
<u>Edgeroll (gray leather)</u> Color not as specified Any crack, hole or tear Not properly secured to shell Excessive glue on edgeroll
<u>Lens stop</u> Color not as specified Any crack, hole or tear
<u>Bayonet receiver kit</u> Spacer not black as specified Any sharp edge or burr Component missing

4.5.3.1 Visual examination of molded shell, unpainted. Prior to preparation for finishing the molded unpainted helmet shell shall be examined as specified in table IV.

4.5.3.2 Visual examination of painted shell prior to installation of edgeroll. The helmet shell shall be examined for defects as specified in table IV prior to installation of the edgeroll.

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4.5.3.3 Visual examination of components prior to assembly of helmet. The components identified below shall be examined for defects prior to installation on the helmet (see 6.10).

- a. Molded shell, unpainted
- b. Helmet shell
- c. Visor, assembly, lightweight
- d. Lens covers, visor
- e. Absorbent liner assembly
- f. Pads, fitting, earcup
- g. Chin strap or nape strap
- h. Energy absorbing liner
- i. Edgeroll (gray leather)
- j. Lens stop
- k. Bayonet receiver kit

4.5.4 End-item visual examination. The complete helmet assembly, consisting of the items below, shall be examined for defects, specified in table V, and cleanliness prior to packing and shipping. The end-item shall also be visually inspected for compliance with commonly accepted manufacturing and workmanship standards (see 6.11).

- a. Helmet Shell
- b. Edgeroll
- c. Earcup section fastener, pile fabric
- d. Visor assembly, lightweight
- e. Chin strap or nape strap
- f. Lens stop

TABLE V. Classification of defects, end-item visual examination.

<p style="text-align: center;"><u>Helmet shell</u></p> <p style="text-align: center;">Any visor snap fastener missing Scratched, scuffed, or abraded areas Hardware not black as specified Identification label missing, illegible, or not of permanent type.</p>
<p style="text-align: center;"><u>Edgeroll (gray leather)</u></p> <p style="text-align: center;">Color not as specified Any crack, hole, or tear Not properly secured to shell Excessive glue on edgeroll</p>
<p style="text-align: center;"><u>Earcup section fastener Pile fabric</u></p> <p style="text-align: center;">Not properly secured to inside of helmet Color not as specified Improperly located in earcup section</p>

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TABLE V. Classification of defects, end-item visual examination. - Continued

<u>Visor assembly, lightweight</u> Edge beading not securely adhered to visor Pile fastener not securely adhered to visor Tears, cracks, or holes in beading Buckle missing Snap fastener component missing Snap fastener incorrectly set Loose stitching, skipped stitches or not back-stitched Ends of webbing not seared Material not as specified Clean, free of fingerprints, dirt
<u>Chin strap or nape strap</u> Assembled to helmet incorrectly
<u>Lens stop</u> Not properly secured to helmet

4.5.5 Shell finish adhesion test. With a scribe held at approximately a 30° angle, cut three parallel lines approximately 0.063 inches apart on the painted surface of the shell. These lines shall be crossed at right angles with three parallel cuts approximately 0.063 inches apart forming four squares. Sufficient pressure shall be applied on the scribe to cut completely through the painted surface. Separation or lifting of any of the shell finish squares from the shell shall constitute failure to pass this test.

4.5.6 Heat exposure test. The helmet assembly shall be stabilized for 1 hour at standard test conditions. The helmet assembly shall then be weighed, and the distance between the shell center reference dimples on the shell shall be measured. The helmet shall be placed on its crown in an air-circulating oven at a temperature of $160 \pm 27^{\circ}\text{F}$ for a 4-hour period. The helmet assembly shall then be removed from the oven and stabilized for 1 hour at standard test conditions. Any change in weight shall not exceed 1 percent nor shall the measured distance vary more than 0.25 inch from the original measurement. Following the heat exposure test, there shall be no distortion of helmet components, defects in finish, or separation of adhesive bonds.

4.5.7 Penetration resistance test. The helmet assembly shall be fit on a rigid headform (see 6.7) to ensure firm support around the target area when properly positioned for tests. The helmet assembly shall be subjected to impacts by a 16-ounce steel bob, having a 60° included angle pointed tip with a radius not greater than 0.015 inch and minimum Rockwell hardness of C-60. The bob shall be dropped (free-fall) from a height of 10 feet onto the outside surface of the helmet shell in a direction perpendicular to the surface. The points of impact shall be one in each 60° sector at a radial distance of 4.5 inches from the apex and at the apex. After each impact the test bob shall be reinserted into the depression with approximately a 10-pound force, and the total depth of its penetration into the helmet shell shall be measured. Penetration in excess of 0.25 inches at any test point shall constitute failure to pass this test.

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4.5.8 Impact protection test. The helmet shell shall be mounted on a rigid headform (see 6.7) and impact tests shall be performed in accordance with ANSI Z90.1 by the rigid anvil method using the hemispherical impactor, and the following exceptions: the helmet shall be subjected to single impacts only at the front, back, crown and each side location. The helmet-headform off-set distance shall be measured at each impact site and the weight of the headform drop system obtained prior to test. Based on the system drop weight, the height of drop shall be determined to deliver 35 foot-pounds impact energy. The acceleration recorded shall not exceed 150g for more than 6 milliseconds, 200g for 3 milliseconds, or 400g.

4.5.9 Windblast protection. The helmet assembly shall be mounted on a rigid headform (see 6.7) with the appropriate oxygen mask in place and the lightweight visor assembly in the operating (down) position. The headform shall then be secured in the test platform and exposed to windblast velocity of 450 ± 20 knots at the attitudes listed below. Separate helmet assemblies may be utilized for each of these attitudes:

- a. Head on
- b. 45° yaw to the right
- c. 45° yaw to the left
- d. 30° pitch aft

The helmet assembly shall not loosen or tear away from the form and shall not break.

4.5.10 Visor optical characteristics. The visor lens shall be inspected and tested in accordance with MIL-V-43511.

4.5.11 Coating abrasion resistance. The coating on the visor lens shall be inspected and tested in accordance with MIL-C-83409.

4.5.12 Weight. The complete helmet assembly, as defined in 3.8, shall be weighed. Weight of the helmet shall be determined in increments of 0.01 oz. minimum.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. 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.

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6. NOTES

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

6.1 Intended use. This helmet assembly is intended for use in high performance aircraft.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Size of helmet (see 1.2).
- c. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual document referenced (see 2.2).
- d. Qualification requirements. The following information items from impact protection testing should be included.
 - (1) Test configuration drop weight
 - (2) Helmet-headform off-set distance
 - (3) Thickness of custom-fit liner and shell opposite all impact sites
 - (4) Drop height
 - (5) Impact velocity
 - (6) Impact energy
 - (7) Acceleration-time data as follows:
 - (a) Peak acceleration
 - (b) Total time of pulse
- e. Selection of applicable levels of preservation, packaging and packing (see 5.1).
- f. Procurement requirements for the following items (see 3.5):
 - (1) Retainer Jack
 - (2) Pad Set, Fittings, Earcup
 - (3) Absorbent Liner Assembly, Medium or Large
 - (4) Headset, Electrical H-154A/A1C Assembly
 - (5) Bag, Lens
 - (6) Visor Assembly, Lightweight (Neutral Gray - MBU-12/P Trim)
 - (7) Bayonet Receiver Kit
 - (8) Cover Lens Assembly
- g. Qualification test samples other than those specified in 4.3.1.1.
- h. Sampling plan requirements.

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- i. Lot size and , if desired, sample size (see 4.4 and 4.4.2).
- j. Procured items such as common hardware (see 4.4.3) will be inspected at receipt and the inspection results will be documented in accordance with the contract.
- k. Identification or marking of product (see 3.7).

6.3 Inspection levels for helmet shell components and end-item examinations. The inspection level for the dimensional examination should be conducted using an acceptable commercial sampling standard such as ANSI/ASQC Z1.4. The helmet shell components should be examined for compliance with dimensions required by the applicable drawing.

6.4 Qualification. The attention of the contractors is called to the requirements with respect to products requiring qualification. Awards will be made only for products which are, at the time of award of contract, qualified for inclusion in the Qualified Products List QPL-87174 whether or not such products have actually been listed by that date. In order that the manufacturers may be eligible to be awarded contracts or purchase orders for the products covered by this specification, they are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification. Information pertaining to qualification of products may be obtained from San Antonio Air Logistics Center/TILDD, 485 Quentin Roosevelt Rd., Kelly AFB, San Antonio, TX 78241-6425.

6.4.1 Retention of qualification. To retain qualification, the manufacturer must forward certification at 2-year intervals to the qualifying activity stating that the company still has the capabilities and facilities necessary to produce the item and that the product has not changed in any way. The qualifying activity will establish the initial reporting date.

6.5 Government furnished property. The items in table VI will be furnished to the contractor for accomplishment of the windblast test.

TABLE VI. Equipment furnished for windblast test.

Quantity	Item
4	Mask, Oxygen, MBU-12/P (MIL-PRF-87163)
4	Bayonet Receiver Kit (Drawing 82A5614)
4	Visor Assembly, Lightweight, MBU-12/P (Drawing 81D5189)
1 Set	TPL fitting set (see 6.4)

6.6 Custom fit liner. The manufacturer will fabricate a TPL suitable for use with the test headform and particular size of helmet shell subjected to penetration, impact and windblast. In this regard, the manufacturer will request the required support items from SA-ALC/TILDD.

6.7 Test headforms. The manufacturer may be required to obtain an appropriate test headform from a test agency for use in the fabrication of custom fit liners.

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6.8 Guidance specifications. The following specifications are suggested as guidance.

- a. MIL-F-495 - Finish, Chemical, Black, for Copper Alloys
- b. MIL-P-19644 - Plastic Foam, Molded Polystyrene, (Expanded Bead Type)

6.9 Sampling. ANSI/ASQC Z1.4 is an accepted commercial sampling standard.

6.10 End-item examination and defects noted during prior production. Table VI provides a list of the areas that have been used in the past for end-item examination and defects noted during prior production.

6.11 MIL-H-83147. Applicable portions of MIL-H-83147, Helmet Shell, Flying, HGU-22/P, have been incorporated into this detail specification. MIL-H-83147 has been inactivated.

6.12 Subject term (key word) listing.

Buffet, anti
 Fiber glass
 Finish, shell
 Impact
 Liner, absorbing, energy
 Molded
 Pad, fitting
 Protection
 Roll, edge
 Strap, Chin

6.13 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:
Air Force – 99

Preparing activity:
Air Force – 82

Review activities:
Air Force - 11, 31, 45

(Project No. 8475-F249)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL			
<u>INSTRUCTIONS</u>			
1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given. 2. The submitter of this form must complete blocks 4, 5, 6, and 7. 3. The preparing activity must provide a reply within 30 days from receipt of the form. NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.			
I RECOMMEND A CHANGE:		1. DOCUMENT NUMBER MIL-DTL-87174A(USAF)	2. DOCUMENT DATE (YYMMDD) 30 October 1998
3. DOCUMENT TITLE Helmet, Flyer's, HGU-55/P			
4. NATURE OF CHANGE <i>(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)</i>			
5. REASON FOR RECOMMENDATION			
6. SUBMITTER			
a. NAME <i>(Last, First, Middle Initial)</i>		b. Organization	
c. ADDRESS <i>(Include zip code)</i>	d. TELEPHONE <i>(Include Area Code)</i> (1) Commercial (2) DSN <i>(if applicable)</i>		7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY			
a. NAME SA-ALC/TILDD		b. TELEPHONE <i>(Include Area Code)</i> (1) Commercial 210-925-6314 (2) DSN 945-6314	
c. ADDRESS <i>(Include Zip Code)</i> 485 Quentin Roosevelt Road Kelly AFB, Texas 78241-6425		IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 DSN 289-2340	