

INCH-POUND

MIL-G-12223J

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SUPERSEDING

MIL-G-12223H

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MILITARY SPECIFICATION

GLOVES, TOXICOLOGICAL AGENTS PROTECTIVE

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

1. SCOPE

1.1 Scope. This specification covers impermeable butyl rubber gloves for protection of the hands against toxicological agents. The gloves are used in conjunction with impermeable protective clothing for the protection of personnel against toxicological warfare agents. The type II gloves are to be worn with M-3 Coverall or M-2 Apron, Toxicological Agent Protective (Army). The type IIA gloves are to be worn in conjunction with the M-4 Coveralls in chemical plants for protection of personnel. The type IV gloves are intended for use as glovebox gloves, on 8-1/2 inch diameter Kewaunee Scientific Corp. #2C145 type glove parts or equivalent in gloveboxes when toxicological agents are handled. This is a special purpose Life Support Clothing and Equipment (LSC&E) item. All Government administrative and surveillance procedures applicable to LSC&E items shall be invoked in accordance with the contract or purchase order (see 6.2).

1.2 Classification. The gloves shall be of the following types and sizes (see 6.2).

- Type II - Protective M2 and M3, without closure ring
- Type IIA - Protective impermeable M4, without closure ring
- Type IV - Glovebox gloves without closure ring

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8415

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited

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Schedule of sizes

Extra small (8) 1/
 Small (9)
 Medium (10)
 Large (11)
 Extra large (12)

1/ Not applicable to type IIA.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 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).

SPECIFICATIONS

FEDERAL

O-C-114	-	Calcium Hypochlorite, Technical
UU-P-553	-	Paper, Wrapping, Tissue
ZZ-G-381	-	Gloves, Rubber, Industrial
PPP-B-566	-	Boxes, Folding, Paperboard
PPP-B-636	-	Boxes, Shipping, Fiberboard
PPP-B-676	-	Boxes Setup
PPP-T-45	-	Tape, Gummed, Paper, Reinforced and Plain, for Sealing and Securing

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MIL-D-12468	-	Decontaminating Agent, STB
MIL-L-35078	-	Loads, Unit: Preparation of Semiperishable Subsistence Items; Clothing, Personal Equipment and Equipage; General Specification For

STANDARDS

FEDERAL

FED-STD-601	-	Rubber: Sampling and Testing
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- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-129 - Marking for Shipment and Storage
- MIL-STD-147 - Palletized Unit Loads
- MIL-STD-282 - Filter Units, Protective Clothing, Gas-Mask Components and Related Products: Performance-Test Methods
- MIL-STD-731 - Quality of Wood Members for Containers and Pallets

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 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

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

8-1-307 - Forms for Gloves, Chemical Protective

(Copies of drawings are available from the U.S. Army Natick Research, Development, and Engineering Center, ATTN: STRNC-EMSS, Natick, MA 01760-5014).

U.S. ARMY ARMAMENT, MUNITIONS & CHEMICAL COMMAND (ABERDEEN)

C5-9-155 - Protective Equipment Suit, Protective Impermeable Cuff (Pants and Sleeve)

(Copies of drawings are available from the U.S. Army Chemical Research, Development and Engineering Center, ATTN: SMCCR-SPD-TS, Aberdeen Proving Ground, MD 21010-5423).

DEPARTMENT OF THE ARMY FIELD MANUAL

FM 3-5 - NUCLEAR, BIOLOGICAL, CHEMICAL, NBC DECONTAMINATION

(Copies of field manuals are available from the U.S. Army Chemical School, ATTN: ATZN-CM-NF, Fort McClellan, Anniston, AL 36205-5020).

2.2 Non-Government publications. The following documents 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 documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- D 297 - Identification of Synthetic Rubber
- D 412 - Rubber Properties in Tension
- D 573 - Rubber-Deterioration in an Air Oven
- D 1053 - Measuring Rubber Property - Stiffening at Low Temperature Using a Torsional Wire Apparatus
- D 3951 - Standard Practice for Commercial Packaging

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 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. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.2 Guide sample. Guide samples, when furnished, are solely for guidance and information to the contractor (see 6.4). Variations from this specification may appear in the sample in which case this specification shall govern.

3.3 Material. It is encouraged that recycled material be used when practical as long as it meets the requirements of this specification.

3.3.1 Rubber compound. The gloves shall be made of butyl rubber, pigmented black, suitably compounded and vulcanized to meet the requirements specified in table I when tested as specified in 4.4.5.

3.3.1.1 Toxicity. The glove material shall be neither a primary dermal irritant nor an allergic sensitizer when used as intended.

TABLE I. Physical and chemical requirements of rubber gloves

Thickness, inch	0.035 \pm 0.010
Tensile strength, p.s.i., minimum:	
Original	1100
After aging	1000
After decontamination solution immersion	800

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TABLE I. Physical and chemical requirements of rubber gloves (cont'd)

Tensile stress at 200 percent elongation, p.s.i.	200 \pm 125
Ultimate elongation, percent, minimum:	
Original	400
After aging	350
After decontamination	300
Low temperature flexibility (types II and IV)	Pass <u>1</u> /
Mustard resistance, minutes, minimum	360
GB resistance, minutes, minimum	450
Deformation due to decontamination solution, maximum:	
After immersion, wet, percent increase in thickness	10.0
After immersion, wet, percent increase in length	15.0
After immersion and aeration, percent increase in thickness	6.0
After immersion and aeration, percent increase in length	4.0
Porosity	Pass <u>2</u> /

1/ The rubber specimens shall have an angular twist no less than the values shown below for the thickness indicated. Interpolation shall be used for any thickness not shown below:

<u>Thickness, inch</u>	<u>Twist, angular degrees, minimum</u>
0.025	138
0.030	119
0.035	99
0.040	84
0.045	70

2/ There shall be no sign of porosity.

3.4 Color and finish. The outside of the finished gloves shall be black with a dull finish.

3.5 Design. The butyl rubber gloves shall be five finger style, with rotated thumb made on any standard commercial glove form using a dipping process to produce gloves of the required size. Types II and IIA gloves may also be made on glove forms shown on Drawing 8-1-307.

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3.6 Construction.

3.6.1 Types II and IV. The types II and IV gloves shall be finished with a rolled edge around the gauntlet no greater than 1/4 inch thick.

3.6.2 Type IIA. The diameter of the glove gauntlet shall be dimensionally compatible with the outside diameter of the plastic sleeve cuff specified in U.S. Army Armament, Munitions & Chemical Command Drawing C5-9-155. When the plastic cuff, or suitable fixture of the same exterior dimensions as the cuff (see 6.2) is inserted into the glove so the large diameter of the plastic cuff is flush with the top of glove, the entire exterior surface of the cuff or fixture shall be in contact with the glove gauntlet. The glove shall be finished with a trimmed straight edge around the top of the gauntlet.

3.6.3 Dusting. The inside and the outside of the finished glove shall be lightly dusted with whiting, talc, or other finely divided non-irritant, non-sensitizing, non-toxic mineral powder which does not support mildew growth.

3.7 Dimensions.

3.7.1 Length. The length of type II gloves shall be 14 inches \pm 1/2 inch. The length of type IIA gloves shall be 16 inches \pm 1/2 inch. The length of type IV gloves shall be 30 inches \pm 3/4 inch. The overall length of types II, IIA, and IV gloves shall be measured from the tip of the middle finger to the cuff edge with the glove flattened and unstretched.

3.7.2 Width. The width of all type gloves shall be as specified in table II. The glove shall be flattened without stretching and the width measured across the palm at the thumb crotch on a line parallel to the cuff edge.

TABLE II. Glove dimensions

Size	Width (inches) all types Tolerance (inch) \pm 1/4
Extra small (8)	4-1/8
Small (9)	4-5/8
Medium (10)	5-1/8
Large (11)	5-5/8
Extra large (12)	6-1/8

3.7.3 Gauntlet opening (type IV). The glove shall be flattened without stretching and the gauntlet opening (width) shall be 12-1/2 \pm 1/4 inches.

3.8 Identification marking. Each glove shall be permanently and legibly marked in bold-faced Gothic capital letters of not less than 1/4 inch in height with either yellow or white indelible marking ink (see 6.6). The palm side of all gloves shall be marked with the glove size and the following legend: (Marking shall be centered approximately 1 inch from the cuff edge.)

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"DO NOT USE FOR ELECTRICAL WORK OR FIRE FIGHTING"

The back side of types II and IV gloves shall be marked with the following information:

"GLOVES, TOXICOLOGICAL AGENTS PROTECTIVE"

The back side of type IIA gloves shall be marked with the following information:

"GLOVES, PROTECTIVE, IMPERMEABLE, M 4"

The back side of all gloves shall be marked with the following information:

SPECIFICATION NO.
CONTRACT NO.
NATIONAL STOCK NO.
TYPE

3.9 Instruction sheet. A paper instruction sheet shall be placed inside one glove of each pair of gloves. The size and style of the letters shall be 1/4 inch (18 point) for heading and 1/8 inch (10 point) for instructions on the use and decontamination of gloves with all lettering legibly printed in black demibold Futura capital letters. The instruction sheet shall contain the following information:

1. If during use, the gloves come in contact with toxicological agents, decontaminate and wash them with water immediately to avoid contaminating other surfaces.
2. If gloves develop holes, become torn, cracked or damaged before use or during use, discard gloves immediately and use a serviceable pair.

DECONTAMINATION OF GLOVES

Gloves exposed to toxicological agents must be decontaminated before reuse. The gloves can be decontaminated by using the procedures specified in FM 3-5 NBC Decontamination.

3.10 Resistance of marking to decontamination procedure. The marking on the glove shall remain clear and legible when tested as specified in 4.4.5.

3.11 Workmanship. The finished gloves shall conform to the quality of product established by this specification and the occurrence of defects shall not exceed the applicable acceptable quality levels. Utmost care shall be taken during component and subassembly fabrication to ensure quality workmanship and safety of the service person using the item.

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4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance 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.

4.1.2 Responsibility for dimensional requirements. Unless otherwise specified in the contract or purchase order, the contractor is responsible for ensuring that all specified dimensions have been met. When dimensions cannot be examined on the end item, inspection shall be made at any point, or at all points in the manufacturing process necessary to ensure compliance with all dimensional requirements.

4.1.3 Certificates of compliance. When certificates of compliance are submitted, the Government reserves the right to inspect such items to determine the validity of the certification.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

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

4.3 First article inspection. When a first article is required (see 3.1 and 6.2), it shall be examined for the defects specified in 4.4.2, 4.4.3, and 4.4.4 and tested for the characteristics specified in 4.4.5.

4.4 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

4.4.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

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4.4.1.1 Component and material certification. A certificate of compliance may be acceptable as evidence that the glove material complies with the toxicity requirements specified in 3.3.1.1 and that the dusting powder used is a non-toxic mineral powder which does not support mildew growth.

4.4.2 End item critical defect examination. Every end item, prior to the visual and dimensional examinations in 4.4.3 and 4.4.4, shall be examined for the critical defects listed in table III. Any end item found to contain one or more critical defects shall be rejected.

4.4.3 End item visual examination. The end items shall be examined for the defects listed in table III. The lot size shall be expressed in units of gloves. The sample unit shall be one glove and the selection shall be by pairs. Defects for pairing shall be classified as a single defect. The inspection level shall be II, and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 2.5 for major defects and 6.5 for total (major and minor combined) defects. The finding of one or more critical defects shall be cause for rejection of the lot.

TABLE III. End item visual defects

Examine	Defect	Classification		
		Critical	Major	Minor
Pairing	Not properly mated, e.g., not right and left of same size.		101	
	Definite variation in color or appearance.			201
Design	Any characteristic not in accordance with specified requirements (unless otherwise indicated herein).		102	
Color and finish	Not black color.			202
	Not dull finish.			203
Construction and workmanship:				
General	Any cut, tear, hole, rip, or rupture through material.	1		
	Any closed blister.	2		
	Any burned spot which cracks on flexing, bending, or stretching (by hand).	3		
	Any pinch, pit, thin spot, abraded area, deep crease, readily removable foreign matter (see note below), or similar defective condition which results in a thickness at the defect less than the minimum thickness allowed for the glove.	4		

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TABLE III. End item visual defects (cont'd)

Examine	Defect	Classification		
		Critical	Major	Minor
Construction and workmanship: General (cont'd)	Any 1 inch square area which contains more than three pinches, pits, thin spots, abraded areas, deep creases, readily removable foreign matter, (see note below), or similar defective condition not resulting in a thickness at the defect less than the thickness allowed for the glove.			204
	Any foreign matter not readily removable in area beyond 4 inches from cuff edge.			205
	Any foreign matter larger than 1/32 inch across, not readily removable, in area within 4 inches from cuff edge.			206
	NOTE: Readily removable foreign matter is defined as material which can be removed by flexing or stretching the glove by hand or by rubbing the defective area with the ball of the thumb or fingers. Cutting, scratching, or otherwise puncturing the surface is not permitted.			
	Any repair or patch.		103	
	Any solid rubber ridge, run, or lump resulting in a thickness greater than the maximum thickness allowed for the glove.			207
	Tackiness after dusting (see 3.6.3). 5			
	Any malformation or distortion seriously affecting serviceability.		104	
	Any malformation or distortion affecting serviceability but not seriously.			208
	Not clean, i.e., dirty but can be cleaned with a cleaning agent.			209
	Not clean, i.e., dirty but cannot be cleaned with cleaning agent.		105	
	Inside and outside of glove not dusted.		106	

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TABLE III. End item visual defects (cont'd)

Examine	Defect	Classification		
		Critical	Major	Minor
Types II and IV	Edge not rolled as specified.		107	
	Rolled edge more than 3/16 inch thick.			210
	Roll crooked or loose.			211
Type IIA	Gauntlet of glove not dimensionally compatible with exterior of plastic cuff.		108	
	Top of gauntlet not finished with trimmed straight edge.			212
Marking, identification, and instruction sheet	Not permanent, i.e., can be easily rubbed off with moistened thumb.			213
	Not in specified location, characters not of height specified, not specified color or not accomplished as specified.			214
	Omitted or illegible.		109	
	Incomplete or incorrect to the extent that the intended purpose will not be served.		110	
	Incomplete or incorrect but not to the extent that the intended purpose will not be served.			215

4.4.4 End item dimensional examination. The end items shall be examined for conformance to the dimensions specified in 3.7. Any dimension not within the specified tolerance shall be classified as a defect. The lot size shall be expressed in units of gloves. The sample unit shall be one glove and the selection shall be by pairs. The inspection level shall be S-3, and the AQL, expressed in terms of defects per hundred units, shall be 4.0.

4.4.5 End item testing. The end items shall be tested for the characteristics listed in table IV. The lot size shall be expressed in units of gloves. The sample shall be drawn in pairs. All requirements shall be applicable to the sample unit. When the data in the "Number of determinations per sample unit" and "Results reported as", columns are not specified in table IV, they shall be as required by the referenced test method. All test reports shall contain the individual values used in expressing the final results.

a. Government acceptance tests (see 6.6). The Government shall perform acceptance tests for mustard and GB resistance. The sample unit shall be two pairs of gloves and the inspection level shall be S-2. These tests are considered critical and any failure shall be cause for rejection of the lot represented by the sample.

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b. Porosity test. The maximum lot size for the porosity test shall be 20,000 pair of gloves. The sample unit shall be one glove and the sample size shall be 800 individual gloves. Any glove found to leak shall be cause for rejection of the lot represented by the sample.

c. All tests other than Government acceptance and porosity tests. For all remaining tests, the sample unit shall be 9 pairs of gloves. The sample size shall be as specified below. The lot shall be unacceptable if one or more sample units fail to meet any requirement specified.

<u>Lot size (gloves)</u>	<u>Sample size (sample units)</u>
800 or less	2
801 to 22,000 inclusive	3
22,001 and over	5

TABLE IV. End item tests

Characteristic	Require- ment	Test method	No. of determin- ations per sample unit	<u>Results reported as</u>	
				Pass or fail	Numerically to nearest
Material identifi- cation (rubber)	3.3.1	D 297 <u>1/</u> <u>2/</u>	1	X	-
Thickness	Table I	4.5.1	-	-	-
Tensile strength:					
Original	Table I	D 412 <u>3/</u> <u>4/</u>	-	-	-
After aging	Table I	D 412 <u>3/</u> <u>4/5/</u>	-	-	-
After decontami- nation solution immersion	Table I	4.5.5	-	-	-
Tensile stress at 200 percent elongation	Table I	D 412 <u>3/</u> <u>4/</u>	-	-	-
Ultimate elongation:					
Original	Table I	D 412 <u>3/</u> <u>4/</u>	-	-	-
After aging	Table I	D 412 <u>3/</u> <u>4/</u> <u>5/</u>	-	-	-
After decontamina- tion solution immersion	Table I	4.5.5	-	-	-
Low temperature flexibility (types II and IV)	Table I	4.5.3	-	X	-

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TABLE IV. End item tests (cont'd)

Characteristic	Require- ment	Test method	No. of determin- ations per sample unit	Results reported as	
				Pass or fail	Numerically to nearest
Mustard resistance	Table I	T 209 <u>6/</u>	2	-	1 minute
GB resistance	Table I	T 208 <u>6/</u>	2	-	1 minute
Deformation due to decontamination solution:					
"After immersion wet:"					
Thickness percent	Table I	4.5.4	-	-	0.1 percent
Length percent	Table I	4.5.4	-	-	0.1 percent
"After immersion and aeration:"					
Thickness percent	Table I	4.5.4	-	-	0.1 percent
Length percent	Table I	4.5.4	-	-	0.1 percent
Porosity	Table I	4.5.2	1	X	-
Resistance of marking to decontamination procedure	3.10	4.5.6	1	X	-

1/ Refers to test method in ASTM D 297.

2/ Only the pyrolysis test shall be used.

3/ Refers to ASTM test method.

4/ Three gloves shall be selected from each sample unit and one specimen shall be tested from each glove selected. Method A of the test shall be used.

5/ The specimens shall be aged at a temperature of 212°F for 48 hours in accordance with ASTM D 573 before being tested for tensile strength and elongation.

6/ Refers to test method in MIL-STD-282.

4.4.6 Packaging examination. The fully packaged end items shall be examined for the defects listed below. The lot size shall be expressed in units of shipping containers. The sample unit shall be one shipping container fully packaged. The inspection level shall be S-2, and the AQL, expressed in terms of defects per hundred units, shall be 2.5.

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<u>Examine</u>	<u>Defect</u>
Marking (exterior and interior)	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application
Materials	Any component missing, damaged, or not as specified
Workmanship	Inadequate application of components, such as: incomplete closure of container flap, improper taping, loose strapping, or inadequate stapling Bulged or distorted container
Content	Number of pairs of gloves is more or less than required

4.4.7 Palletization examination. The fully packaged and palletized end items shall be examined for the defects listed below. The lot size shall be expressed in units of palletized unit loads. The sample unit shall be one palletized unit load, fully packaged. The inspection level shall be S-1, and the AQL, expressed in terms of defects per hundred units, shall be 6.5.

<u>Examine</u>	<u>Defect</u>
Finished dimensions	Length, width, or height exceeds specified maximum requirement
Palletization	Pallet pattern not as specified Interlocking of loads not as specified Load not bonded as specified
Weight	Exceeds maximum load limits
Marking	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application

4.5 Methods of inspection.

4.5.1 Thickness test. Thickness of the gloves shall be determined in accordance with Method 2011 of FED-STD-601. Three gloves from each sample unit shall be tested. Five measurements shall be made on each of the three gloves in the area not less than 1 inch nor more than 5 inches from the cuff edge. The crotches of the gloves shall also be measured for thickness. The sample unit shall fail if any single measurement is less than the minimum or greater than the maximum specified.

4.5.2 Porosity test. The porosity test shall be performed as specified in ZZ-G-381 except that the air pressure shall be 0.5 pound per square inch, and the inflated glove will be immersed in the water in stages, for observation of porosity as indicated by air bubbles. Initially, the glove will be immersed to a point where the water line is just above the crotch of the fingers. Observation for air bubbles will take place for a period of 30 seconds. If no air bubbles are seen the

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glove will be lowered until the water line is above the wrist. Again, observation for air bubbles in this area will take place for 30 seconds. If no air bubbles are observed the remainder of the glove shall be immersed and for another 30 seconds checked for air bubbles. No visible bubbles shall be permitted within the three, 30 second observation times. At no time should the area of the glove being observed for air bubbles be further than 6 inches below the surface of the water. The pressure exerted by the water below this 6 inch depth can be great enough to prevent the release of air bubbles from a small hole or tear.

4.5.3 Low temperature flexibility test (types II and IV). Low temperature flexibility shall be determined in accordance with ASTM D 1053, paragraph entitled Routine Inspection and Acceptance with the following exceptions:

- a. The test shall be conducted at -20°F.
- b. The liquid coolant shall be methyl alcohol.
- c. The exposure time shall be 5 minutes.
- d. The black wire having a torsional constant of 0.125 gf. cm/degree shall be used instead of the standard wire.
- e. The angular degree of twist shall be in accordance with table I.

4.5.4 Deformation due to decontamination solution test. Three gloves from each sample unit shall be tested. The resistance to decontamination solution shall be determined as follows:

- a. Accurately mark a 3 by 6 inch area on each glove. Draw three straight lines along the entire length of the area as follows: The first line shall be 1/2 inch in from one edge of the marked area, the second line 1/2 inch in from the opposite edge. The third line shall be 1-1/2 inches from both edges. Then draw three straight lines across the entire width of the area as follows: The first line shall be 2 inches in from one edge of the marked area, the second line 2 inches in from the opposite edge. The third line shall be 3 inches from both edges. Using a micrometer as described in Method 2011 of FED-STD-601 determine the thickness of the area at the nine points where the three length lines cross the three width lines. The thickness shall be the average of the nine values.

- b. Mount the glove on a suitable form and immerse in test solution to within 1 inch of the cuff edge, taking care not to wet the interior. The test solution shall be a Super Tropical Bleach slurry. The slurry shall be made up (by weight) of 1 part Super-Tropical Bleach (STB) conforming to MIL-D-12468 and 2 parts water. (NOTE: Super-Tropical Bleach is corrosive to most metals and is injurious to most fabrics. A protective mask and gloves should be worn when handling this material.) The temperature of the slurry during the test shall be 80° to 90°F. The time of immersion shall be 5 minutes.

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c. After the 5 minute immersion in STB slurry, withdraw the glove, wash off the slurry with water and rinse in 95 percent ethyl alcohol. While the glove is still wet, measure the marked area immediately for thickness and length. Thickness shall be determined as described in "a" above. The length shall be measured along the three length lines and the length recorded as the average of the three measurements.

d. Place the wet gloves on heavily talced paper towels and allow to stand at room temperature for 18 hours.

e. After the 18 hours air drying, remeasure the marked area for thickness and length. Determine thickness in accordance with "a" above. Determine the length in accordance with "c" above.

f. The percent increase in thickness and percent increase in length shall be calculated as follows:

$$\text{Percent increase in thickness after immersion (wet)} = \frac{T_1 - T}{T} \times 100$$

$$\text{Percent increase in thickness after immersion and aeration} = \frac{T_2 - T}{T} \times 100$$

$$\text{Percent increase in length after immersion (wet)} = \frac{L_1 - L}{L} \times 100$$

$$\text{Percent increase in length after immersion and aeration} = \frac{L_2 - L}{L} \times 100$$

Where:

- T = Original thickness as determined in "a" above
- T₁ = Thickness after immersion as determined in "c" above
- T₂ = Thickness after immersion and aeration as determined in "e" above
- L = Original length (6 inches)
- L₁ = Length after immersion as determined in "c" above
- L₂ = Length after immersion and aeration as determined in "e" above

4.5.5 Tensile strength and ultimate elongation after decontamination test.

The tensile strength shall be determined in accordance with ASTM D 412 (Method A). The cross sectional area of the specimen shall be calculated using the thickness determined in 4.5.4a. The ultimate elongation shall be determined in accordance with ASTM D 412 (Method A). One specimen shall be cut from each glove that was tested for decontamination. The specimen shall be cut from the 3 by 6 inch area marked on the gloves. The long dimension of the specimen shall be parallel to the long dimension of the 3 by 6 inch area. The specimen shall be cut in such a manner that each end of the specimen is the same distance from the edge of the marked area.

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4.5.6 Resistance of marking to decontamination procedure. The gloves shall be tested as follows:

- a. Boil gloves for 2-1/2 to 3 hours in a solution containing 1.25 ounces per gallon of calcium hypochlorite conforming to O-C-114.
- b. Remove gloves from the bleach solution and soak in fresh water at 70°F for 15 minutes. Change water and repeat this step two additional times.
- c. Hang the gloves and allow them to dry at about 110°F.
- d. When dry, examine all types of gloves for legibility of marking.

5. PACKAGING

5.1 Preservation. Preservation shall be level A or Commercial as specified (see 6.2).

5.1.1 Level A. Each pair of type II and type IIA gloves shall be completely wrapped in tissue paper conforming to type I, class 1 or 2 of UU-P-553. Each pair of gloves of one type and size only shall then be unit packed in a folding paperboard box conforming to variety 1, style III, type G, class i of PPP-B-566; or a set-up paperboard box conforming to type I, variety 1, class A or D, style 4 of PPP-B-676. Outside dimensions of each paperboard box shall be as specified in table V. The box closure shall be secured with 2-inch minimum width gummed paper tape conforming to type III, grade B of PPP-T-45 applied at the center of the length opening and extending along the bottom and up each side at least 2 inches.

TABLE V. Paperboard box outside dimensions (inches)

Type	Length	Width	Depth
II	15-3/8	6-3/4	2-1/4
IIA	17-5/8	6-3/4	2-1/4
IV	33-1/4	8-1/2	3-1/4

5.1.2 Commercial. Gloves shall be preserved in accordance with ASTM D 3951.

5.2 Packing. Packing shall be level A, B, or Commercial as specified (see 6.2).

5.2.1. Level A packing. Ten pairs of type II, type IIA, or type IV gloves of one size only, preserved as specified in 5.1, shall be packed in a snug-fitting fiberboard shipping container conforming to style RSC, grade V2s of PPP-B-636. Level A unit packs shall be packed on their side 10 in length, 1 in width, and 1 in depth within a shipping container for types II and IIA gloves, and 1 in length, 10 in width, and 1 in depth for type IV gloves. Each shipping container

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shall be closed in accordance with method III, waterproofed in accordance with method V, and reinforced as specified in the appendix of PPP-B-636, except that the inspection shall be in accordance with 4.4.6. Shipping containers shall be arranged in unit loads in accordance with MIL-L-35078 for the type and class of load specified (see 6.2). Strapping shall be limited to nonmetallic strapping, except for type II, class F loads.

5.2.2 Level B packing. Ten pairs of type II, type IIA, or type IV gloves of one size only, preserved as specified in 5.1, shall be packed in a snug-fitting fiberboard shipping container conforming to style RSC, type CF (variety SW) or SF, class domestic, grade 275 of PPP-B-636. Level A unit packs shall be packed on their side 10 in length, 1 in width, and 1 in depth within a shipping container for types II and IIA gloves, and 1 in length, 10 in width, and 1 in depth for type IV gloves. Each shipping container shall be closed in accordance with method II as specified in the appendix of PPP-B-636, except that the inspection shall be in accordance with 4.4.6.

5.2.2.1 Weather-resistant fiberboard container. When specified (see 6.2), the shipping container shall be a grade V3c, V3s or V4s fiberboard box fabricated in accordance with PPP-B-636 and closed in accordance with method III as specified in the appendix of PPP-B-636, except that the inspection shall be in accordance with 4.4.6.

5.2.3 Commercial packing. Gloves, preserved as specified in 5.1, shall be packed in accordance with ASTM D 3951.

5.3 Palletization. When specified (see 6.2), gloves, packed as specified in 5.2.2 or 5.2.3, shall be palletized on a 4-way entry pallet in accordance with load type Ia of MIL-STD-147. Pallet type shall be type I (4-way entry), type IV, or type V in accordance with MIL-STD-147. Pallets shall be fabricated from wood groups I, II, III, or IV of MIL-STD-731. Each prepared load shall be bonded with primary and secondary straps in accordance with bonding means C and D or film bonding means F or G. Pallet pattern shall be in accordance with the appendix of MIL-STD-147. Interlocking of loads shall be effected by reversing the pattern of each course.

5.4 Marking. In addition to any special marking required by the contract or purchase order, bundles, shipping containers and palletized unit loads shall be marked in accordance with MIL-STD-129 or ASTM D 3951, as applicable, and each unit pack shall be marked with the legend "DO NOT USE FOR ELECTRICAL WORK OR FIRE FIGHTING".

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 gloves are intended to be used in conjunction with impermeable protective clothing for the protection of personnel against toxicological warfare agents. The type II gloves are to be worn with M-3 Coverall or M-2 Apron, Toxicological Agents Protective (Army). The type IIA

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gloves are to be worn in conjunction with the M-4 coveralls in chemical plants for protection of personnel. The type IV gloves are intended for use as glovebox gloves, on 8-1/2 inch diameter Kewaunee Scientific Corp. #2C145 type glove parts or equivalent in gloveboxes when toxicological agents are handled.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Special provisions for verification inspection of Life Support Clothing and Equipment (see 1.1).
- c. Type and size (see 1.2).
- d. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- e. When first article is required (see 3.1, 4.3, and 6.3).
- f. Whether plastic sleeve cuff for type IIA is to be furnished by the Government or whether the contractor is to furnish appropriate fixture (see 3.6.2).
- g. Levels of preservation and packing (see 5.1 and 5.2).
- h. Type and class of unit load (see 5.2.1).
- i. When weather-resistant grade fiberboard shipping containers are required for level B packing (see 5.2.2.1).
- j. When palletization is required (see 5.3).

6.3 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of FAR 52.209. The first article should be a preproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Sample. For access to samples, address the contracting activity issuing the invitation for bids.

6.5 Marking ink. Markem JXN-7410-H-White or Yellow made by Makem Machine Co., 40 Putnam Street, Keene, NH, has been found to be suitable when dried under infrared light for 24 hours.

6.6 Tests. Items for Testing of HD resistance, GB resistance, shall be directed to U.S. Army Munitions & Chemical Command, ATTN: Test Br./Bldg. E5100, Aberdeen Proving Ground, MD 21010 (see 4.4.5).

6.7 Subject term (key word) listing.

Butyl rubber
Five finger style
Impermeable
Protective clothing

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

Custodians:

Army - GL
Navy - NU
Air Force - 99

Preparing activity:

Army - GL
(Project 8415-0734)

Review activities:

Army - EA, MD
* Air Force - 82
DLA - CT

User activities:

Navy - MC
Air Force - 45