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MILITARY SPECIFICATION

PLASTIC MEDIA, FOR REMOVAL OF ORGANIC COATINGS

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

1. SCOPE

* 1.1 Scope. This specification covers six types of plastic media used for removal of organic coatings in an abrasive blast operation.

* 1.2 Classification. The plastic media shall be classified by type and color as follows:

1.2.1 Types.

Type I - Polyester (Thermoset)

Type II - Urea Formaldehyde (Thermoset)

Type III - Melamine formaldehyde (Thermoset)

Type IV - Phenol formaldehyde (Thermoset)

Type V - Acrylic (Thermoplastic)

Type VI - Poly (allyl diglycol carbonate)(Thermoset)

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, Naval Air Warfare Center Aircraft Division Lakehurst, Code SR3, Lakehurst, NJ 08733-5100, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 5350
DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited

* 1.2.3 Colors. When colored is specified, finished products shall be uniformly colored as specified below.

Color No.		
1	Type I	- Light blue
2	Type II	- Light yellow
3	Type III	- Light pink
4	Type IV	- Dark brown
5	Type V & VI	- White to light Grey
6	Type I thru IV	- Color unspecified (see note below)

NOTE: Type V and VI shall only be white to light grey.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

* 2.1.1 Specifications and standards. The following specifications and standards 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

L-P-378	-	Plastic Sheet and Strip, Thin Gauge, Polyolefin
P-D-680	-	Dry Cleaning Solvent
QQ-A-250/4	-	Aluminum Alloy, 2024, Plate and Sheet
QQ-A-250/12	-	Aluminum Alloy 7075, Plate and Sheet
RR-S-366	-	Sieves, Standard, for Testing Purposes
UU-S-48	-	Sacks, Shipping Paper
CCC-C-440	-	Cloth, Cheesecloth, Cotton, Bleached and Unbleached
PPP-B-601	-	Box, Wood, Cleated Plywood
PPP-B-621	-	Box, Wood, Nailed and Lock Corner
PPP-D-705	-	Drum, Shipping and Storage: Steel, 16 and 30 Gallon Capacity
PPP-D-723	-	Drums, Fiber

MILITARY

MIL-P-116	-	Preservation, Methods of
MIL-B-117	-	Bags, Sleeves and Tubing
MIL-A-9962	-	Abrasive Mats, NonWoven and Nonmetallic
MIL-P-23377	-	Primer Coating, Epoxy Polyamide, Chemical and Solvent Resistant
MIL-B-43666	-	Box, Shipping, Consolidation
MIL-C-81706	-	Chemical Conversion Materials for Coating Aluminum and Aluminum Alloys
MIL-C-83286	-	Coating, Urethane, Aliphatic Isocyanate, For Aerospace Application
MIL-C-85570	-	Cleaning Compound, Aircraft, Exterior

STANDARDS

FEDERAL

FED-STD-313	-	Material Safety Data, Transportation Data and Disposal For Hazardous Materials Furnished To Government Activities

MILITARY

MIL-STD-104	-	Limit For Electrical Insulation Color
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

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

2.1.2 Other Government documents. The following other Government documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DEPARTMENT OF TRANSPORTATION

DOT 22A	-	Wooden Drums, Glued Plywood
DOT 22B	-	Wooden Drums, Glued Plywood

NAVAL CIVIL ENGINEERING LABORATORY (NCEL)

NCEL REPORT CR 87.011 - Explosibility and Ignitability of Plastic Abrasive Media

* 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).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D792	-	Test Method for Specific Gravity and Density of Plastics by Displacement
ASTM D2583	-	Indentation Hardness of Rigid Plastics by Means Of a Barcol Impressor
ASTM D3682	-	Test Method for Major or Minor Elements in Coal and Coke Ash by the Atomic Absorption Method
ASTM D3951	-	Commercial Packaging
ASTM STP 447 B	-	Manual on Test Sieving Methods

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

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

AMS 4377	-	Magnesium Alloy, Sheet and Plate, 3.0 Al 1.0 Zn, Cold Rolled, Partially Annealed (AZ31B-H26)

(Application for copies should be addressed to the Society of Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA 15096.)

(Nongovernment 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 (except for related associated detail specifications, specification sheets or MS standards), 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. Unless otherwise specified in the contract or purchase order, a sample of the finished product shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

* 3.2 Materials. The finished product shall be made from chlorine-free cured plastic stock of polyester (for Type I), urea formaldehyde (for Type II), melamine formaldehyde (for Type III), phenol formaldehyde (for Type IV), acrylic plastic (for Type V) or poly (allyl glycol carbonate)(for Type VI), by processing to the desired size distribution specified herein. The finished product shall be magnetically cleaned prior to shipment. The finished product shall contain no inorganic fillers, but may contain anti-static agents. The odor of the finished product shall not be objectionable during actual use.

* 3.2.1 Hardness of plastic stock. The Barcol hardness of the plastic stock prior to crushing shall be within the following limits, when tested as specified in 4.5.1 (The approximate MOH hardness is included for information only):

Type	Barcol hardness	Approx. MOH hardness
I	34 to 42	3.0
II	54 to 62	3.5
III	64 to 72	4.0
IV	54 to 62	3.5
V	46 to 54	3.5
VI	30 to 40	3.0

* 3.2.2 Color. Non-fluorescent dyes or pigments shall be allowed for coloration and shall be blended into the resin prior to cure (see 1.2.3). Type V plastic media shall contain no inorganic pigments. Where uniform colors are specified, the following color codes shall be used (all colors shall be in accordance with MIL-STD-104):

Type I	Light blue
Type II	Light yellow
Type III	Light pink
Type IV	Dark brown
Type V & VI	White to light grey

* 3.2.3 Sources of plastic stock. The finished product shall be manufactured from selected plastic stock of the exact chemical type required by this specification. Finished product shall be manufactured from virgin plastic stock (material in the form of unprocessed sheet or block made specifically for the production of plastic media); or the plastic stock shall be scrap plastic (material produced as a by-product of the manufacture of plastic items such as shirt buttons, dinnerware, etc.). An infrared spectrogram of the finished product shall be essentially identical to those in Figures 1 through 6, dependent on type, when analyzed as specified in 4.5.2. Mixtures of different types of plastics or of plastic stock material shall not be permitted.

* 3.2.4 Explosibility and ignitability. The finished product shall not be an explosive or an ignitable hazard (See 6.6).

3.2.5 Toxicity. The finished product shall have no adverse affect on the health of personnel when used for its intended purpose. Material safety data sheets for the dyes or pigments used in the media, for the media itself and for any material added to the media after curing (such as antistatic agents) shall be prepared and submitted in accordance with FED-STD-313, one copy of which shall accompany the sample being submitted for first article inspection. Questions pertinent to the effect of the finished product on the health of personnel when used for its intended purpose shall be referred by the acquiring activity to the appropriate medical service(see 4.3.2 and 6.4).

3.3 Physical and chemical properties. The physical and chemical properties of the finished product shall be in accordance with Table I, when tested as specified in 4.5.

3.4 Particle size. The finished product shall have a particle size distribution as shown in Table II, when tested as specified in 4.5.10.

3.5 Performance. The finished product shall conform to the performance property requirements of Table III and the surface residue and anti-static behavior requirements of 3.5.1 and 3.5.2, respectively, when tested using finished product conforming to the 20-30 particle size distribution. Other sizes of finished product shall be manufactured from the same plastic stock and shall differ only in size distribution resulting from the manufacturer's screening operation. Blasting parameters and requirements shall be as specified in Table III.

* 3.5.1 Surface residue. Types I thru IV and VI shall not produce a surface residue which interferes with the application of MIL-C-81706 aluminum chromate conversion coating. Blast residues from Type V shall be removable with methyl ethyl ketone. Testing shall be as specified in 4.5.11.4.

3.5.2 Anti-static behavior. The finished product shall not cling to the interior walls of a well grounded blast booth or glove box during the stripping test specified in 4.5.11.1.

3.6 Storage stability. After storage for one (1) year under normal conditions of storage, the finished product shall meet all the requirements of this specification.

3.7 Workmanship. The finished product shall be manufactured in accordance with the best commercial practice for this type of product and shall be free from any foreign matter detectable with the naked eye.

* Table I. Physical and chemical properties.

Property	Requirement by Type						Test Para
	I	II	III	IV	V	VI	
Chlorine content, max	Trace	Trace	Trace	Trace	Trace	Trace	4.5.3
Ash content, max. (% by wt.)	1.0	2.0	2.0	2.0	0.5	0.5	4.5.4
Iron Content, max. (% by wt.)	0.05	0.10	0.10	0.10	0.05	0.05	4.5.4.1
Specific gravity							4.5.5
minimum	1.15	1.47	1.47	1.47	1.10	1.28	
maximum	1.25	1.52	1.52	1.52	1.20	1.33	
Extract content, max (% by wt.)	5.0	1.0	1.0	1.0	1/	1.0	4.5.6
pH of water extract							4.5.7
minimum	4	4	4	4	4	4	
maximum	8	8	8	8	8	8	
Conductivity (umho/cm, max)	100	100	100	100	100	100	4.5.7
Water absorption (% by wt, max)	2.0	10.0	10.0	10.0	2.0	2.0	4.5.8
Heavy particulates (% by wt, max)	0.02	0.02	0.02	0.02	0.02	0.02	4.5.9
Light particulates (% by wt, max)	0.1	1.0	1.0	1.0	0.1	0.1	4.5.9

1/ Because of the solubility characteristics of Type V materials, the extract content shall be a minimum 95% by weight, minimum.

TABLE II. Particle size distribution.

U.S. Standard Screen Size	12-20 Maximum % Retain	12-20 Pass	12-16 Maximum % Retain	12-16 Pass	16-20 Maximum % Retain	16-20 Pass	20-30 Maximum % Retain	20-30 Pass	20-40 Maximum % Retain	20-40 Pass	30-40 Maximum % Retain	30-40 Pass	40-60 Maximum % Retain	40-60 Pass	60-80 Maximum % Retain	60-80 Pass
10	0.1	--	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--
12	5	--	5	--	0.1	--	--	--	--	--	--	--	--	--	--	--
16	--	--	--	20	15	--	0.1	--	0.1	--	--	--	--	--	--	--
20	--	20	--	5	--	20	15	--	15	--	--	--	--	--	--	--
25	--	--	--	--	--	--	--	--	--	--	0.1	--	--	--	--	--
30	--	5	--	--	--	5	--	20	--	60	15	--	--	--	--	--
35	--	--	--	--	--	--	--	--	--	--	--	--	0.1	--	--	--
40	--	--	--	--	--	--	--	5	--	20	--	20	5	--	--	--
50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1	--
60	--	--	--	--	--	--	--	--	--	5	--	5	--	20	5	--
80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20
100	--	1	--	1	--	1	--	2	--	2	--	3	--	5	--	5

* Table III. Performance properties.

Property	Type I	Type II	Type III	Type IV	Type V	Type VI	Test para
Blast parameters							4.5.11
Nozzle Pressure (psi) 1/	50	25	25	25	30	25	
Feed rate (lbs/hr)	215-245	140-170	125-155	140-170	140-170	130-160	
Property							
Stripping rate Sq ft/minute,(min)	0.15	0.15	0.15	0.15	0.15	0.15	4.5.11.1
Aggressiveness mg/sq cm, max	0.20	0.50	3.00	0.50	0.20	0.75	4.5.11.2
Consumption Avg % per cycle, max.	20	13	13	13	6	15	4.5.11.3

1/ Air pressure in the hose immediately adjacent to the nozzle as measured with a hypodermic needle.

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 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must 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 assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Source inspection. The finished product furnished under this specification shall be source inspected to insure that the plastic media meets the Quality Conformance Inspection prior to leaving the manufacturer's plant. The material shall be packaged as specified in Section 5 of this specification. The manufacturer shall maintain a record of the quality test results and retain a small sample, by lot number, for a period of two years. A copy of the quality conformance test report shall be forwarded to the contracting officer.

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).

4.2.1 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in the test method document or the applicable paragraph of this specification. Standard laboratory conditions shall be 22° ± 2°C (72.4° ± 4°F) and 50 ± 20 percent Relative Humidity.

4.3 First article inspection. First article inspection shall consist of all the tests and inspections specified in Table IV. There shall be no failures in any requirement (see 6.3).

4.3.1 First article approval. After a manufacturer has passed the first article inspection for a product under this specification, that product shall, at the option of the Government, not be subject to the first article procedures for a period of two (2) years. After the two year period, the Government may require the manufacturer to undergo the first article tests or request certification that the finished product or manufacturing processes have not been changed during this period.

4.3.1 1 First article re-inspection. The Government may require first article re-inspection when a manufacturer changes the source of the raw stock during the course of a contract. It will be the responsibility of the manufacturer to inform the Government when this occurs.

4.3.2 First article samples. The first article sample shall consist of 50 pounds of finished product packaged as specified in section 5 of this specification. Additionally, a sample of the plastic stock, suitable for determining hardness, shall be included. The product shall be produced in the facility to be used in filling the contract or purchase order.

4.3.3 Manufacturer's data. In addition to the first article samples, the manufacturer shall submit a certified test report which shows the material forwarded for first article meets all the requirements of this specification. The manufacturer shall include written certification that the finished product meets the requirements for material (3.2), hardness of plastic stock (3.2.1), color (3.2.2), sources of plastic stock (3.2.3), explosibility and ignitability (3.2.4), toxicity (3.2.5) and storage (3.6) See 6.4). The manufacturer shall also furnish the toxicological data required to evaluate the safety of the material and any additives added after curing of the base resin for the proposed use through the submission of the Material Safety Data Sheet detailed in FED-STD-313.

4.4 Quality conformance inspection.

4.4.1 Lot formation.

* 4.4.1.1 Charge lot. Unless otherwise specified, a charge lot shall be defined as all the material of the same type and color that is to be processed

into finished product in the same plant by the same supplier during a consecutive period of time whether the operation is continuous or batch. A charge lot shall not exceed 50,000 pounds (22,680 Kg).

* 4.4.1.2 Finished lot. A finished lot shall consist of no more than 10,000 pounds (4,500 Kg) of each size media derived from the charge lot (see 4.4.1.1), whether the operation is continuous or batch.

4.4.2 Sampling and inspection.

* 4.4.2.1 Visual examination. A random sample of finished product (see 4.4.1.2) shall be selected from each lot in accordance with Inspection Level S-2 of MIL-STD-105. The sample unit shall be one pound (0.5 Kilogram) of plastic media which shall be obtained by selective sorting in accordance with ASTM STP 447 B. Each unit of the sample shall be visually examined for conformance to the color and workmanship requirements. Nonconformance of the sample to either requirement shall be cause to reject the lot represented by the sample.

* 4.4.2.2 Physical property examination.

* 4.4.2.2.1 Charge lot. A sufficient amount of each charge lot shall be randomly selected, then tested for conformance to the Material (3.2), hardness (3.2.1), and Infrared spectrogram requirements. Failure to conform to any of the above requirements shall be cause to reject all finished product produced during the period represented by the sample.

* 4.4.2.2.1 Finished product. After the visual examination specified in 4.4.2.1, each sample unit shall be tested for conformance to the Particle size (3.4), specific gravity (Table I), heavy and light particulates (Table I), conductivity and pH (Table I), Ash content (Table I) and extract content (Table I). Failure of any test specimen to conform to any quality conformance requirement, shall be cause to reject the entire finished product lot.

4.4.2.3 Packaging inspection.

4.4.2.3.1 Examination for packaging and marking. An examination shall be made to determine that packaging and marking comply with the requirements of Section 5 of this specification. Defects shall be scored in accordance with Table V. The sample unit for this examination shall be one shipping container fully prepared for delivery, except that it shall not be palletized and need not be sealed. Shipping containers fully prepared for delivery that have not been palletized shall be examined for closure defects. The lot size shall be the number of shipping containers in the end item inspection lot. The samples for this examination shall be selected at random in accordance with MIL-STD-105, Inspection Level S-2 and an AQL of 4.0 Defects Per Hundred Units.

4.4.2.3.2 Examination for palletization. An examination shall be made to determine that the palletization complies with the requirements of Section 5 of this specification. Defects shall be scored in accordance with Table VI. The sample unit shall be one palletized unit load fully prepared for delivery. The lot size shall be the number of palletized unit loads in the end item inspection lot. The samples for this examination shall be selected at random in accordance with MIL-STD-105, Inspection Level S-1 and an AQL of 6.5 Defects Per Hundred Units.

Table IV First Article Inspection.

Characteristic	Requirement	Test paragraph
Material	3.2	4.5.2
Hardness, plastic stock	3.2.1	4.5.1
Color	3.2.2	Visual
Infrared spectrogram	3.2.3	4.5.2
Chlorine	Table I	4.5.3
Ash content	Table I	4.5.4
Iron content	Table I	4.5.4.1
Specific Gravity	Table I	4.5.5
Extract content	Table I	4.5.6
pH	Table I	4.5.7
Conductivity	Table I	4.5.7
Water absorption	Table I	4.5.8
Heavy and light particulates	Table I	4.5.9
Particle size	3.4	4.5.10
Performance	3.5	4.5.11
Paint stripping rate	Table III	4.5.11.1
Aggressiveness	Table III	4.5.11.2
Product consumption	Table III	4.5.11.3
Surface residue	3.5.1	4.5.11.4
Anti-static behavior	3.5.2	4.5.11.1.2
Storage stability	3.6	All of above
Workmanship	3.7	Visual

4.5 Test methods. Tests shall be performed at standard laboratory conditions (see 4.2.1). Finished product samples for tests shall be obtained through selective sorting as specified in ASTM STP 447 B.

4.5.1 Hardness. Barcol hardness shall be determined in accordance with ASTM D 2583. The hardness shall be determined on the selected plastic stock before processing to the finished product. The hardness shall be in accordance with the requirement of 3.2.1

TABLE V. Packaging inspection.

Examine	Defect
Packaging	Container not as specified; closures not accomplished by specified or required methods or materials. Puncture, break, leakage of contents. Non-conforming components, component missing, damaged or otherwise defective. Bulged or distorted container.
Markings	Data omitted, illegible, incorrect, incomplete, or not in accordance with contract requirements.

TABLE VI. Palletization inspection.

Examine	Defect
Finished dimension	Length, width, or height exceeds specified maximum requirement.
Palletization	Not as specified. Pallet pattern not as specified. Interlocking of loads not as specified. Load not banded with required straps as specified.
Weight	Exceeds maximum load limits.
Marking	Omitted, incorrect, illegible, of improper size, location, sequence or method of application.

4.5.2 Infrared spectrogram. The finished product shall be prepared for analysis by grinding to a very fine powder with a suitable mortar and pestle (quartz or agate is recommended). A potassium bromide (KBr) pellet shall be prepared using approximately 0.5 mg of sample and 200 mg of dry KBr. The infrared spectrogram of the pellet shall be determined using a spectrophotometer with a minimum resolution of 2.5 cm^{-1} and operating from 4000 to 400 cm^{-1}.

4.5.3 Chlorine by sodium fusion. Weigh 0.05 gm of finished product into a disposable glass test tube, add a piece of sodium metal (about 0.15 gm) to the tube, then heat over a bunsen burner to a dull red. Allow the test tube contents to cool, then add 0.5 ml ethanol to the tube and allow it to react until there is no evidence of residual sodium metal. Heat the test tube carefully to evaporate the ethanol and continue to heat until it glows a dull red. Immediately drop the test tube into 50 mls of distilled water, crush the lower end of the tube, and stir to dissolve any sodium chloride which has formed. Filter the solution into a 250 ml beaker, acidify with 10 or more drops of concentrated nitric acid, and add 10 drops of 0.1 M silver nitrate and swirl the beaker several seconds. The presence of chlorine is indicated by the development of a white precipitate which disappears upon the addition of several drops of concentrated ammonium hydroxide. The finished product shall be defined as having no more than a trace of chlorine when the white precipitate is less than that produced when 50 ml of a 16.5 ppm sodium chloride solution in distilled water is treated with acid and silver nitrate as above.

4.5.4 Ash content. Three grams of finished product shall be weighed to the nearest 0.1 mg into a tared ceramic crucible. The finished product shall be ignited with a fisher burner until no loss of material is visually apparent. The crucible shall be heated in a muffle furnace at 850°C (1560°F) to constant sample weight. The ash residue shall be calculated as a percent of initial sample weight.

4.5.4.1 Iron content. Total iron content of the finished product shall be determined using the ash from 4.5.4 in accordance with ASTM D 3682. Total iron content shall be calculated as follows:

$$\text{Total iron content}(\%) = \frac{\text{ash content}(\%) \times \text{iron content}(\%)}{100}$$

4.5.5 Specific gravity. Specific gravity shall be determined in accordance with ASTM D 792 using n-butyl alcohol as the immersion liquid.

4.5.6 Extract content.

4.5.6.1 Type V, only. One (1) gram (weighed to the nearest 0.0001 gram) shall be mixed with 100 ml of methylene chloride in a 250 ml beaker until the media is completely dissolved, but not longer than 10 minutes. The mixture shall be poured through a Whatman No. 2V folded filter, or equivalent. The filtrate shall be collected in a tared 250 ml beaker. The filter shall be washed with an additional 25 ml of methylene chloride and collected in the tared beaker. The solvent shall be evaporated by heating for four (4) hours at approximately 60°C (122°F), followed by an additional hour at approximately 105°C (220°F). The beaker shall be weighed to the nearest 0.0001 grams and percent extract calculated in accordance with the equation in 4.5.6.2.

4.5.6.2 All other types. A 25 gm sample of finished product shall be weighed to the nearest 0.1 mg into a 250 ml beaker. One hundred ml of methylene chloride shall be added and the beaker covered with a watch glass and magnetically stirred for one hour. The mixture shall be filtered through a prewashed, slow, fluted paper filter into a tared 250 ml beaker, rinsing the retained media with an additional 25 ml of solvent. The filtrate shall be evaporated to remove the solvent by heating in a vented, forced draft oven at 60° ± 2°C (140° ± 2°F) for 4 hours. The residue shall be weighed to the nearest 0.1 mg and the extract content calculated as follows:

$$\text{Extract content (\%)} = \frac{\text{residue weight X 100}}{\text{Sample weight}}$$

4.5.7 pH and conductivity. Twenty-five grams of the finished product shall be added to a clean 100 ml glass graduated cylinder that has been thoroughly rinsed with distilled water. Distilled water shall be added to the 100 ml mark of the cylinder, then stoppered. The cylinder shall be shaken for 5 seconds, then permitted to stand undisturbed for 5 minutes. The cylinder shall then be shaken again and the pH and conductivity of the mixture determined for conformance to the requirement in Table I.

4.5.8 Water absorption. Five grams of finished product, weighed to the nearest 0.1 milligram, shall be weighed into a tared covered Petri dish. The contents shall be dried in a 105° ± 2°C (221° ± 4°F) oven for 1 hour, then covered cooled and reweighed. The uncovered dish shall be placed in 100 percent relative humidity chamber at standard temperature for 24 hours. The dish shall be removed from the chamber, covered, and then reweighed. Water absorption shall be calculated as follows:

$$\text{Water absorption} = \frac{B-A}{A} \text{ X100}$$

Where A = weight of dried finished product
B = weight of moist finished product.

4.5.9 Heavy and light particulate contaminants.

4.5.9.1 Solvent preparation. The solvent shall be prepared from trichlorotrifluoroethane (specific gravity of 1.565) and fluid conforming to P-D-680 (specific gravity of 0.78). Two solvent mixtures shall be prepared to yield the following specific gravities: Mixture A shall be 0.10 greater than the specific gravity of the finished product (for Types II, III, and IV, use pure trichlorotrifluoroethane or prepare a blend of P-D-680 and a perfluoroalkane solvent, such as 3M Fluorinet, FC-5311, with a specific gravity of 2.03.). Mixture B shall be 0.10 less than the specific gravity of the finished product.

4.5.9.2 Light particulates. One hundred grams of the finished product shall be added to a tall form 600 ml beaker, followed by 400 ml of Mixture B. The contents shall be stirred for 1 minute, then allowed to stand for 5 minutes. Any floating particulates shall be decanted onto a 200 mesh screen, tared to the nearest 0.001 gram. The sieve shall be dried to constant weight in an oven maintained at 105° ± 2°C (221° ± 4°F). The light contaminant particulates shall be calculated as follows:

$$\text{Particulate contamination} = \frac{\text{Residue weight}}{\text{Sample weight}} \times 100$$

4.5.9.3 Heavy particulates. Four hundred ml of Mixture A shall be added to 500 ml separatory funnel, followed by the addition of 100 grams of the finished product. The funnel shall be vibrated from side to side while in an upright position for 1 to 2 minutes, then be allowed to stand upright for 5 minutes. The settled material shall be drained from the funnel onto a 200 mesh sieve, tared to the nearest 0.001 gram. The sieve shall be dried to constant weight in an oven maintained at 105° ± 2°C (221° ± 4°F). Heavy particulate contaminants shall be calculated as specified in 4.5.9.2 above.

4.5.10 Particle size distribution.

4.5.10.1 Apparatus. The shaker shall operate with a single eccentric circular motion at 285 ± 10 revolutions per minute and with a tapping action of 150 ± 5 strokes per minute to obtain a dependable sieve analysis. The shaker shall accommodate six, 8-inch (20.3 centimeters) diameter sieves with pan and cover. Screen sizes shall conform to U.S. Standard screen sizes as specified in RR-S-366. Only screens for which a requirement is specified in Table II shall be used to test a specific size range. For example: Only U. S. standard screen sizes 16, 20, 30, 40, 60 and 100 shall be used to test 20-40 materials for conformance to Table II requirements.

4.5.10.2 Procedure. The sieves shall be nested in the order of decreasing size with the largest sieve on top and a pan on the bottom. A sample weighing 75 to 100 grams shall be obtained using sampling techniques recommended in ASTM STP 447 B, weighed to the nearest 0.1 gram, and placed on the top sieve of the nest. The nest of sieves with the cover in position shall be placed in the testing machine (shaker) and vibrated for exactly 10 minutes with the tapper in operation. The abrasive remaining on each sieve and pan shall be weighed and reported. Calculate the necessary percentages to determine compliance with 3.4. The sieves shall be cleaned using a plastic (nylon) bristle brush which insures complete removal of the trapped media.

4.5.11 Performance. Performance testing shall be conducted in a direct pressure blasting device. The blasting parameters shall be as specified in Table III and the following:

a.	Nozzle distance from substrate	--	10 inches
b.	Nozzle angle (from horizontal)	--	80 degrees
c.	Nozzle size	--	1/4 inch dia. (Vacu-Blast Corp., P/N 245840 or equivalent)

4.5.11.1 Paint stripping rate.

4.5.11.1.1 Panel preparation. An aluminum alloy sheet conforming to QQ-A-250/4 (T3 temper) approximately 15 inch by 15 inch by at least 0.06 inch thick (40 cm by 40 cm by at least 0.15 cm) shall be treated as follows:

a. Wipe with acetone, then manually abrade with very fine abrasive mat (MIL-A-9962) soaked with deionized water by rubbing back and forth in a single direction until the surface is water break free.

b. Immediately wipe the sheet clean and dry with cheesecloth conforming to CCC-C-440, Class 1.

c. Within 4 hours, immerse the sheet in a MIL-C-81706 aluminum conversion coating solution (1 oz/gal) for three minutes. Rinse thoroughly with deionized water for one minute and allow to dry in an upright position.

d. Within 24 hours the sheet shall be painted as specified in Table VII.

TABLE VII. Performance test panel paint system

Coating	Thickness (mils)	Drying time
MIL-P-23377 (Epoxy primer)	0.6 - 0.9	1 hour
MIL-C-83286, Color No. 36440 or 36495	1.7 - 2.3	7 days at room temperature. Followed by 7 days at 66° ± 1°C (150° ± 2°F)

4.5.11.1.2 Procedure Each painted panel shall be marked to outline a 1 square foot area centered on the panel. The nozzle position shall be fixed within the cabinet and the test panel shall rest horizontally. The test panel shall be moved across the blast stream until the marked area is completely stripped. The stripping rate shall be determined as follows:

$$\text{Stripping rate} = \frac{\text{Area stripped}(ft^2)}{\text{Removal time (minutes)}}$$

Plastic blast media anti-static behavior shall be observed during the stripping operation.

4.5.11.2 Aggressiveness. Using a very fine abrasive mat (MIL-A-9962), one side of a 0.060 inch (0.15 cm) thick magnesium alloy sheet (AMS 4377) shall be abraded to remove any oxidation or protective surface treatment. Rectangular specimens, 0.75 by 1.50 inches (2.0 by 4.0 cm), shall be cut from the sheet, solvent wiped with methyl ethyl ketone then isopropanol using a lint free absorbent cloth and dried. Each specimen shall be weighed to the nearest 0.1 mg then installed in an Almen strip holder and placed in a blast booth so that the center of the specimen coincides with the center of the blast stream. The specimen shall be blasted for one minute using the parameters specified in 4.5.12 at the applicable pressure and feed rate specified in Table III. After blasting, the specimen shall be solvent wiped as above, dried, then weighed to the nearest 0.1 mg. The aggressiveness shall be calculated as follows:

$$\text{Aggressiveness (mg/sq cm)} = \frac{\text{Specimen weight loss (mg)}}{\text{Specimen top surface area(sq cm)}}$$

4.5.11.3 Product consumption. A representative sample of finished product shall be obtained and the percentage (a) of material retained on a U. S. Standard 30 mesh screen (using only this screen) determined in accordance with 4.5.10. Ten pounds, weighed to the nearest 0.1 pound, of finished product shall be charged to the same blast equipment used for stripping rate tests. The blast equipment shall be operated using the same parameters specified in 4.5.11 and the applicable pressure and feed rate specified in Table III, with the reclaim system off. The use of a device (i.e. 60 mesh screen) shall be permitted to prevent blow-by losses during recovery of the media. An aluminum plate 15 by 15 by 0.25 inch (38 by 38 by 0.6 cm) conforming to QQ-A-250/12, T6 temper, shall be blasted until all of the charged media is expended. The expended product shall be collected and recharged to the hopper. This procedure shall be repeated for a total of 4 cycles, after which the recycled product shall be recovered and weighed (R). Using a representative sample of the recycled product, the percentage of material retained on a 30 mesh screen shall be determined as above. Consumption shall be calculated as follows:

$$\text{Consumption (Avg \% per cycle)} = \frac{10a - Rb}{40a}$$

Where a = initial percentage retained on 30 mesh
b = recycle percentage retained on 30 mesh
R = Recovered weight (lbs) of recycled product after 4 cycles.

4.5.11.4 Surface residue. A 4 by 12 by 0.02 to 0.50 inch (10 by 30 by 0.05 to 1.2 cm) aluminum test panel conforming to QQ-A-250/4, T3 temper, shall be abraded manually with a very fine abrasive mat (MIL-A-9962) wet with deionized water. The test panel shall be thoroughly rinsed with deionized water and wiped dry with bleached cheesecloth (CCC-C-440, Class 1). One half of the aluminum test panel shall be masked with a similar panel. The exposed portion of the test panel shall be blasted for one minute with the finished product as specified in 4.5.12.1.2. The blasted test panel shall be washed with a 10 percent by volume solution of MIL-C-85570, Type II, by swabbing gently with bleached cheesecloth. Panels blasted with Type V media shall also be wiped with cheesecloth wet with methyl ethyl ketone after the MIL-C-85570 wash. All panels shall be thoroughly rinsed with deionized water and wiped dry with the cheesecloth. The dried test panels shall be immersed in a chromate conversion coating solution (1 ounce of MIL-C-81706, Class 1 per one gallon deionized water) for three minutes. The panels shall be rinsed with deionized water for one minute. The blasted portion of the test panel shall be compared with the masked portion. A significant difference in color or non-uniformity of the alodine coating on the blasted portion of the panel indicates an interfering residue.

5. PACKAGING

5.1 Preservation. Preservation shall be level A or commercial, as specified in the contract or purchase order (see 6.2).

5.1.1 Level A. Level A preservation shall be Method III in accordance with MIL-P-116.

* 5.1.1.1 Unit packing. The plastic media shall be placed in paper sacks, fiber drums or plywood drums. Each container shall be lined with a plastic bag of suitable size to accomodate the media being packaged.

* 5.1.1.1.1 Sacks. The plastic media shall be unit packed in 50 pound quantities, using multiwall paper sacks that are in accordance with UU-S-48, Type II or III. The plastic liner bags shall be in accordance with type I, class B, style 2 of MIL-B-117 and shall be constructed from 0.002 inch thick material conforming to type I, class 1, untreated of L-P-378.

* 5.1.1.1.2 Drums. The plastic media in 200 to 250 pound quantities, as specified, shall be unit packed in fiber drums that are in accordance with PPP-D-723 type I, II, or III, or in 50 to 200 pound quantities, as specified, in plywood drums that are in accordance with DOT 22A or DOT 22B. Plastic media in 200 to 250 pound quantities may be unit packed in steel drums, suitable for solid waste disposal, conforming to Type V, PPP-D-705. The plastic liner bags shall be in accordance with type I, class B, style 2 of MIL-B-117 and shall be constructed from 0.002 inch thick material conforming to type I, class 1, untreated of L-P-378.

5.1.2 Commercial. Commercial preservation shall be in accordance with ASTM D 3951.

5.2 Packing. Packing shall be level A, level B or commercial.

5.2.1 Level A. In accordance with the contract or purchase order, the specified number of sacks or fiber drums shall be packed in exterior containers conforming to MIL-B-43666, type I or II or PPP-B-601, overseas type or PPP-B-621, overseas type. Plastic media unit packed in accordance with DOT containers 22A or 22B or PPP-D-705 shall not be packed in exterior containers; the unit pack will be the shipping container.

5.2.2 Level B. PLastic media unit packed in accordance with UU-S-48 sacks or PPP-D-723 fiber drums will not be packed in exterior containers; the unit pack will be the shipping container.

5.2.3 Commercial. Commercial packing shall be in accordance with ASTM D 3951.

5.3 Unitization. When specified in the contract or purchase order the shipping containers shall be palletized in accordance with MIL-STD-147.

5.4 Marking. In addition to any special marking or labeling indicated in the contract or purchase order, all interior and exterior containers shall be marked in accordance with MIL-STD-129.

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 plastic media covered by this specification is intended as an abrasive blasting material for paint removal. The visual appearance of surfaces stripped using this media can vary from no discernible effect to extensive erosion damage. Other damage may occur which is not visually apparent, but which may be manifested as loss of fatigue life. Those effects are dependent on the nature of the substrate, plastic media used, type and degree of contamination of recycled media, nozzle pressure, angle of impingement and distance of blast nozzle from the work. Prior to the use of these media for production blasting, appropriate engineering studies shall be initiated to determine the effect of the process and the media on the substrate. Surface residue can result from the use of any plastic media and should be removed prior to refinishing. Type V residues must be removed using methyl ethyl ketone or similar solvent. Type I, II, III, IV and VI residues can be removed using a detergent wash.

6.2. Acquisition requirements. Acquisition documents should specify the following:

a. Title, number and date of this specification
b. 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)
c. Part number (see 6.8)
d. Quantity required
e. Levels of preservation (see 5.1)
f. Type of container and amount per container (see 5.1.1)
g. Whether palletization is required (see 5.3)
h. Whether first article is required (see 4.3).

6.3 First article. When a first article inspection is required, the item should be a standard production item from the contractor's current inventory. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results and disposition of first articles (see 4.3). Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract or purchase order.

6.3.1 Approved sources. Awards to furnish finished product under this specification shall be made only for products which have first article approval. Federal Government activities desiring to purchase the products specified herein on local requisition shall contact the Warner Robins Air Logistics Center (WR-ALC/CNC), Warner Robins Air Force Base, Georgia 31913 for the list of approved media sources.

6.4 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DOD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

Reference Paragraph	DID Number	DID Title	Suggested Tailoring
4.3.3	DI-NDTI-80809A	Test/Inspection Report	

The above DID's were those cleared as of the date of this specification. The current issue of DOD 5010.12-L, Acquisition Management Systems and Data requirements Control LIst (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.4 Material safety data sheets. Contracting officers will identify those activities requiring copies of completed Material Safety Data Sheets prepared in accordance with FED-STD-313. The pertinent Government mailing addresses for submission of data are listed in appendix B of FED-STD-313.

6.5 Batch. A batch is defined as a homogeneous quantity of finished product, manufactured at one time or representing a blend of several manufactured units of finished product of the same formulation.

6.6 Explosibility and ignitability. The Naval Civil Engineering Laboratory Contract Report CR 87.011 of June 1987 covers an investigation of Types I, II, III, and V media. A similar evaluation of Type IV and VI materials shall be required prior to procurement of that type. An evaluation procedure follows:

* 6.6.1 Explosibility and ignitability. The finished product shall be tested in accordance with the U. S. Department of the Interior, Bureau of Mines recommended practice for determining such hazards as set forth in NCEL Report No. CR 87.011. Finished product which satisfies the following criteria are not considered explosive or ignitable hazards when used in a properly designed blast system:

Equipment	Media size	Parameter	Limit
1.2-L Furnace	200 mesh or smaller	Minimum autoignition temperature (MAIT)	350°C(662°F)
20-L Chamber with 2500 J ignitor	200 mesh or smaller	Lean flammability limit (minimum)	40g/cu M.
20-L Chamber with 5000 J ignitor		Maximum explosible size	40 mesh

* 6.7 Part Numbers. Part numbering system shall be as indicated below. This number is intended for cataloging and ordering purposes.

M85891 -	X	X -	XXXX
Specification identifier	Type I - 1 Type II - 2 Type III - 3 Type IV - 4 Type V - 5 Type VI - 6	Color No. (see 1.2.3)	Particle size range (see 3.4)

Example. Type I, 12 to 20 particle size range plastic blast media may be ordered as M85891-11-1220 or M85891-16-1220. Type II, 12 to 20 particle size range is ordered as M85891-22-1220 or M85891-26-1220. Types V and VI 12 to 20 particle size shall be ordered only as M85891-55-1220 and M85891-65-1220, respectively.

6.8 Subject term (key word) listing.

Environmental
First article
Paint removal
Plastic
Source inspection
Thermoset
Thermoplastic
Trichlorotrifluoroethane

6.9 Changes from previous issue. The margins of this specification are marked with asterisks to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:
Army - AV
Navy - AS
Air Force - 99

Review Activities:
Air Force - 84

Preparing activity:
Navy - AS
Project No. 5350-0026

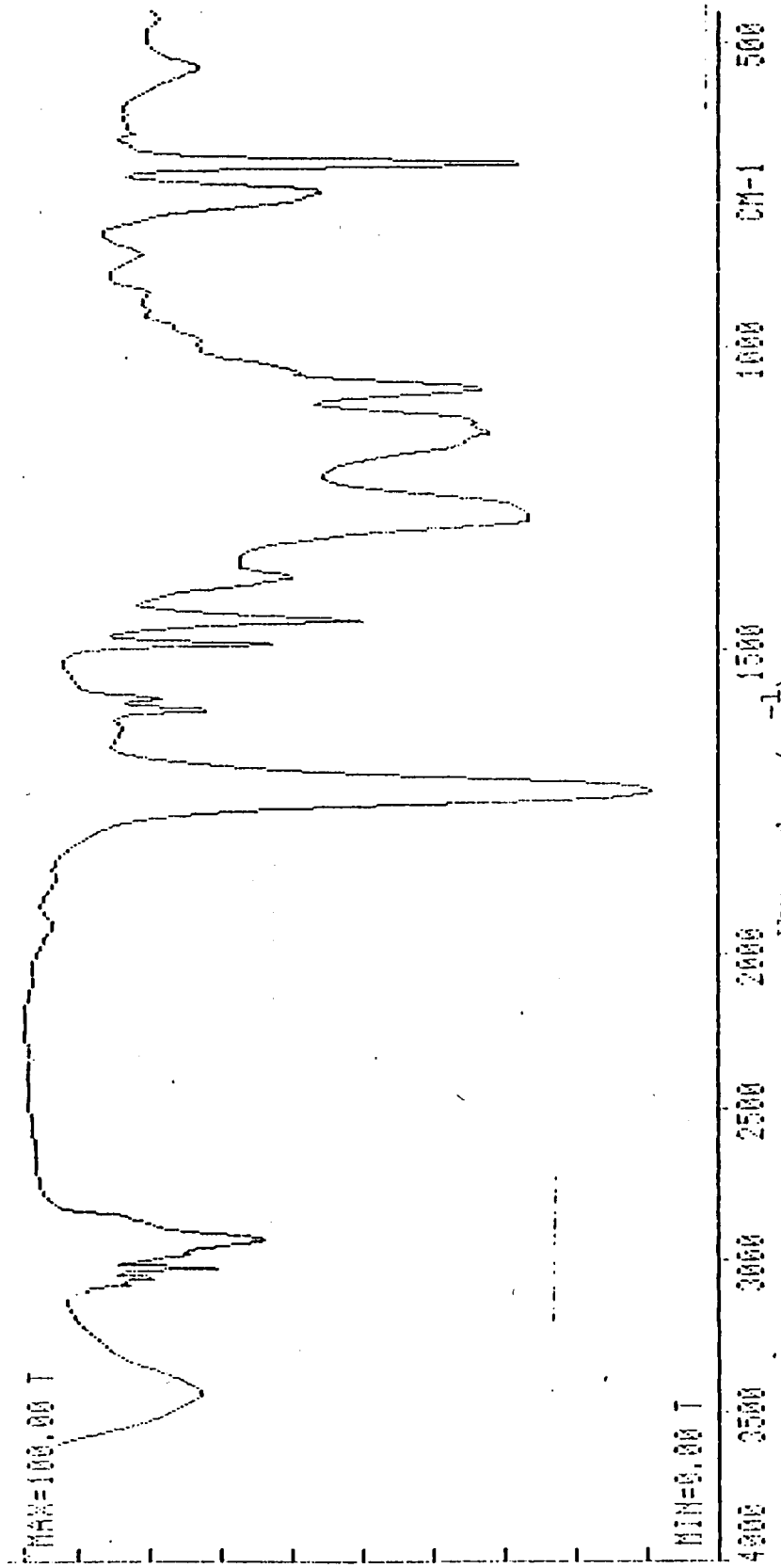


FIGURE 1. Type I - Polyester

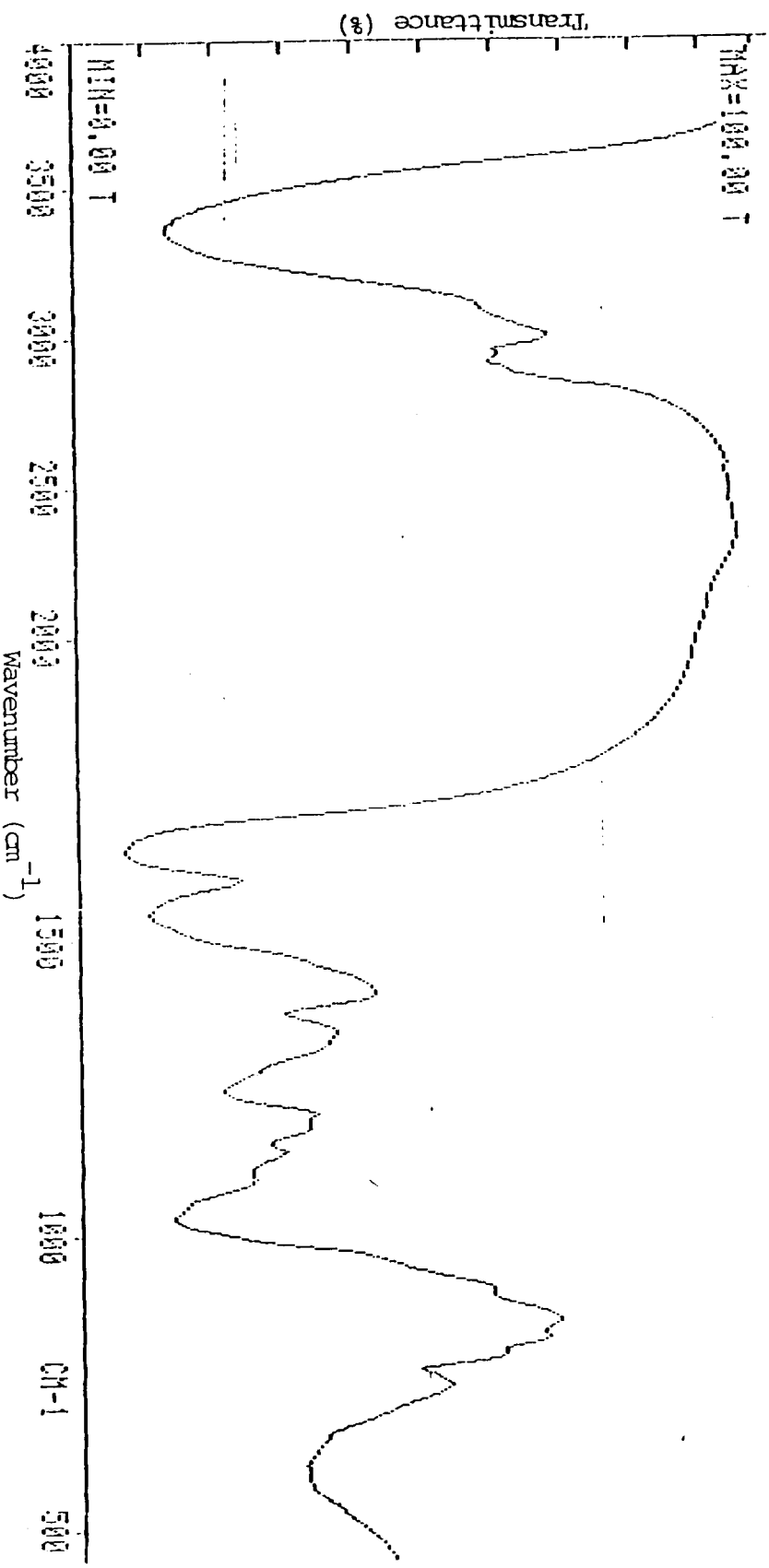


FIGURE 2. Type II - Urea formaldehyde

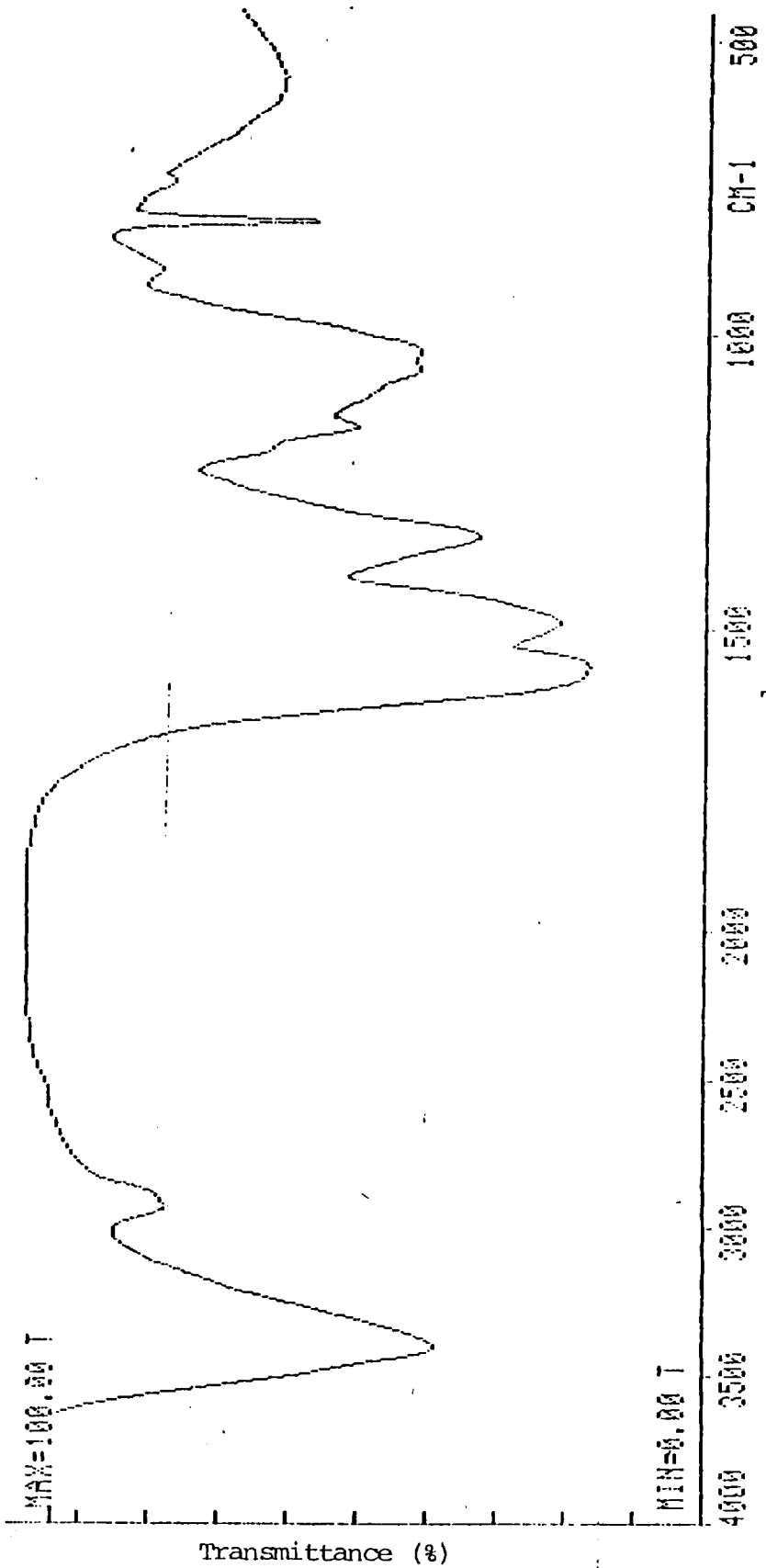


FIGURE 3. Type III - Melamine formaldehyde

AVAILABLE TYPE IV CANDIDATES DID NOT
MEET ENOUGH SPECIFICATION REQUIREMENTS
TO INCLUDE AN INFRARED SPECTROGRAM.

FIGURE 4. Type IV - phenol formaldehyde.

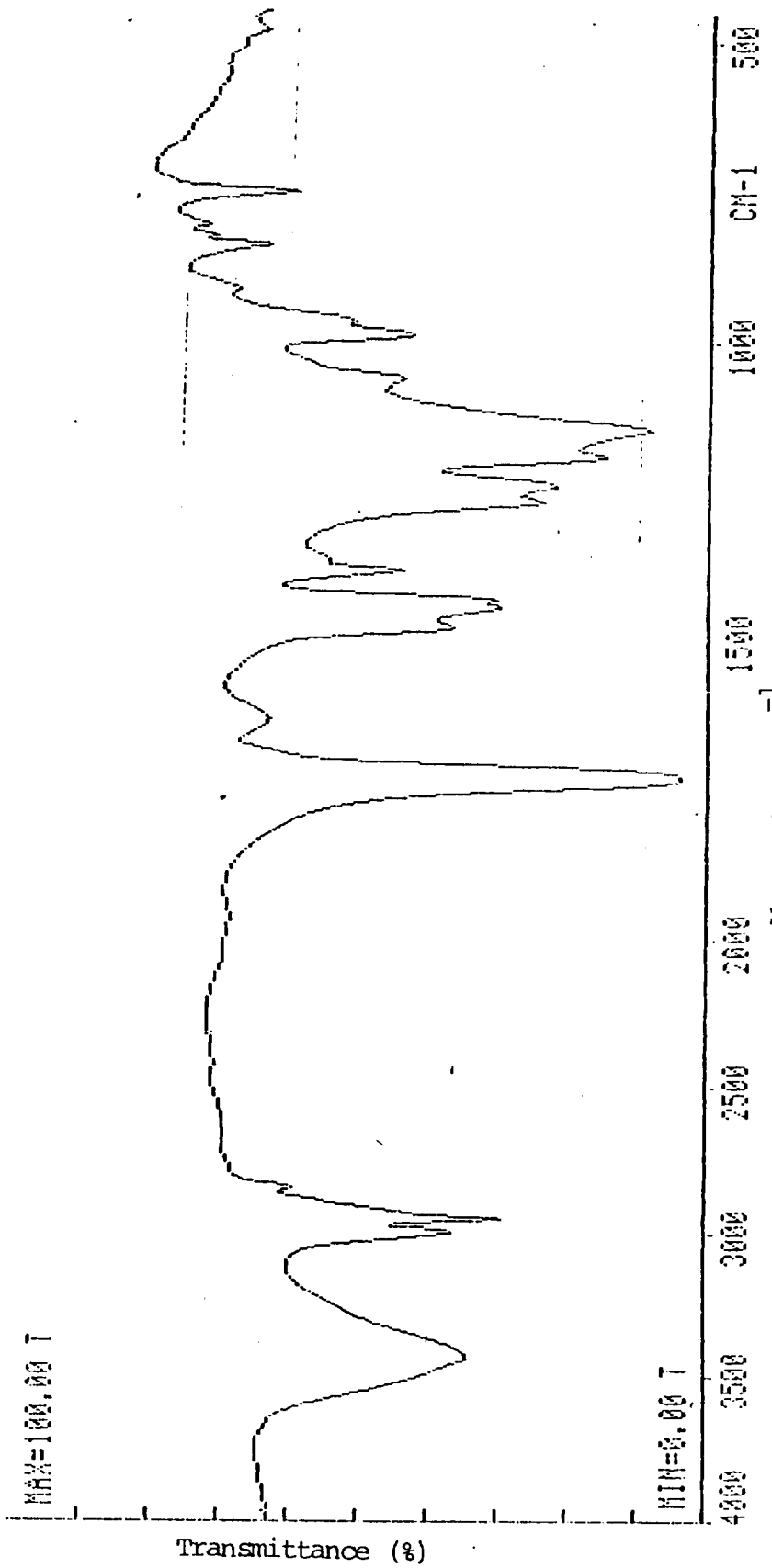


FIGURE 5. Type V - Acrylic

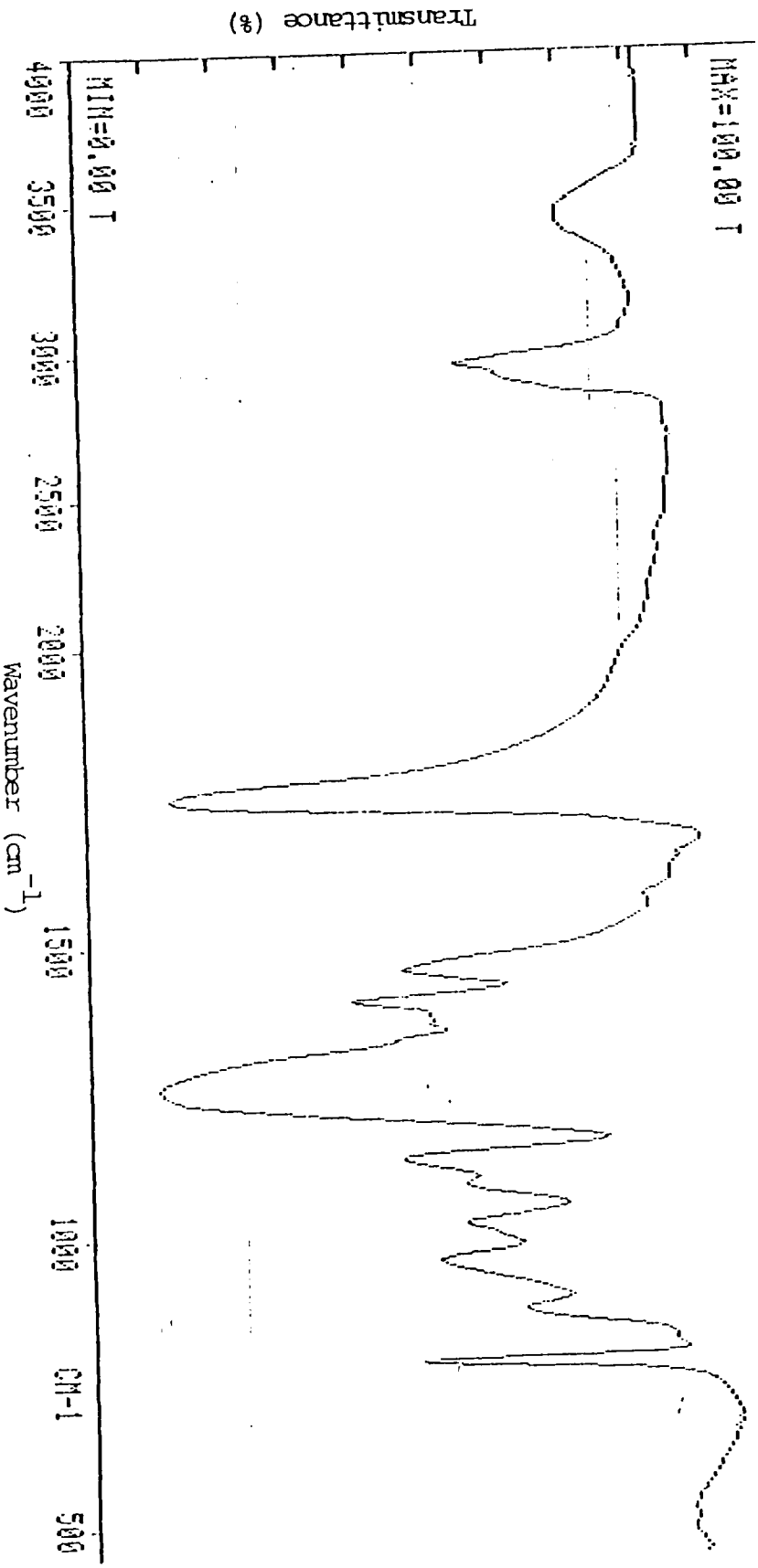


FIGURE 6. Type VI - Poly (allyl diglycol carbonate)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

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-P-85891A	2. DOCUMENT DATE (YYMMDD) 92/04/01

3. DOCUMENT TITLE
PLASTIC MEDIA, FOR REMOVAL OF ORGANIC COATINGS

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME COMMANDING OFFICER, NAVAL AIR WARFARE CENTER AIRCRAFT DIVISION LAKEHURST SYSTEMS REQUIREMENTS DEPARTMENT	b. TELEPHONE (Include Area Code) (1) Commercial: (908) 323-7488 (2) AUTOVON: 624-7488
c. ADDRESS (Include Zip Code) CODE SR3 LAKEHURST, NJ 08733-5100	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 AUTOVON 289-2340