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P-D-680B
October 29, 1992
SUPERSEDING
P-D-680A
September 9, 1988

FEDERAL SPECIFICATION

DRY CLEANING AND DEGREASING SOLVENT

This specification was approved by the Assistant Administrator, Office of Federal Supply and Services, General Services Administration, for the use of all Federal Agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. Dry cleaning and degreasing solvent consists of three types of petroleum distillates. The different types are referred to as "Stoddard solvent", "140 °F solvent", and "200 °F solvent". They are used for dry cleaning, spot and stain removing, and for degreasing of machine parts in equipment maintenance.

1.2 Classification. Dry cleaning and degreasing solvent shall be the following types:

Type I - Regular (Stoddard solvent) (Military Symbol SD-1)
Type II - High flash point (Military Symbol SD-2)
Type III - Low odor with very high flash point (200 °F) (Military Symbol SD-3)

1.2.1 NATO classification.

Type I - S-752
Type II - S-753
Type III - None

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).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: USA Belvoir Research, Development, and Engineering Center, ATTN: SATBE-TSE, Fort Belvoir, VA 22060-5606 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 6850
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Federal Standard:

FED-STD-141	- Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling and Testing.
FED-STD-313	- Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities.
FED-STD-791	- Lubricants, Liquid Fuels, and Related Products; Method of Testing.

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions, as outlined under General Information in the Index of Federal Specifications and Standards, and Commercial Item Descriptions. The Index, which includes cumulative bimonthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification, other Federal specifications, and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston, MA; New York, NY; Philadelphia, PA; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Houston, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Auburn, WA.

(Federal Government activities may obtain copies of Federal standardization documents and the Index of Federal Specifications, Standards, and Commercial Item Descriptions from established distribution points in their agencies.)

Military standards:

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-290	- Packaging of Petroleum and Related Products.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks 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 document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

Code of Federal Regulations:

49 CFR	- Transportation.

(application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402.)

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Federal Environmental Protection Agency (EPA) Standards:

EPA Methods for Chemical Analysis of Water and Wastes, Method 420.1 Phenolics, Total Recoverable.

(Application for copies should be addressed to the USEPA, Environmental Monitoring and Support Laboratory, 26 West Martin Luther King Drive, Cincinnati, OH 45268.)

2.2 Non-Government publications. The following document(s) form a part of this specification 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 cited in the solicitation (see 6.2).

American Society for Testing and Materials (ASTM) Standards:

D 56 - Flash Point by Tag Closed Tester, Test Method for.
D 86 - Distillation of Petroleum Products, Test Method for.
D 130 - Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test, Method for.
D 156 - Saybolt Color of Petroleum Products (Saybolt Chromometer Method), Test Method for.
D 235 - Mineral Spirits (Petroleum Spirits) (Hydrocarbon Drycleaning Solvent), Standard Specification for.
D 445 - Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosities).
D 611 - Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents, Test Method for.
D 847 - Acidity of Benzene, Toluene, Xylenes, Solvent Naphthas, and Similar Industrial Aromatic Hydrocarbons, Test Method for.
D 1133 - Kauri-Butanol Value of Hydrocarbon Solvents, Test Method for.
D 1296 - Odor of Volatile Solvents and Diluents, Test Method for.
D 1298 - Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method.
D 2879 - Vapor Pressure-Temperature Relationships and Initial Decomposition Temperature of Liquids by Isoteniscope, Test Method for.
D 4057 - Manual Sampling of Petroleum Products, Practice for.
D 4177 - Automatic Sampling of Petroleum and Petroleum Products, Method for.

(The ASTM test methods listed above are available from ASTM, 1916 Race Street, Philadelphia, PA 19103.)

South Coast Air Quality Management District:

Rule 102 - Photochemically Reactive Solvents.

(Application for copies should be addressed to the South Coast Air Quality Management District, 9150 E. Flair Drive, El Monte, CA 91731)

(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.)

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2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Quantitative and qualitative requirements. The solvents shall conform to the physical and chemical requirements in table I when tested as specified in 4.5 and to the qualitative and quantitative requirements as specified herein.

TABLE I. Dry cleaning and degreasing solvent properties.

CHARACTERISTICS	TYPE I	TYPE II	TYPE III
Flash point, °C, min	38.0 (100 °F)	60.0 (140 °F)	93.3 (200 °F)
Distillation, °C:			
Initial boiling pt., min	149	177	220
50 % recovered	Report	Report	Report
Dry point, °C, max	208	211	295
Aniline point, °C	57 to 74	57 to 74	73 to 89
Kauri-butanol value	29 to 45	29 to 45	27 to 45
Allowable constituents, (% by volume): 1/			
(a) Solvent with olefinic or cyclo-olefinic unsaturation, max	5	5	0.8
(b) Aromatic compounds with eight or more carbon atoms, except ethyl-benzene, max	8	8	0.8
(c) Total of ethylbenzene, toluene, and branched chain ketones, max	20	20	1
(d) Total of (a) + (b) + (c), max	20	20	1
Total chlorine content (ppm) max	100	100	100
Apparent specific gravity	0.754 to 0.820	0.754 to 0.820	0.740 to 0.840
Non-volatile residue (mg/100 mL), max	10	10	10
Color, min	25	25	30
Odor 2/	Characteristic & non-residual	Characteristic & non-residual	Low & non-residual
Corrosion, copper, max 3/	2A	2A	2A
Acidity	neutral	neutral	neutral
Doctor test	*negative*	*negative*	*negative*
Vapor pressure, Torr @ 20 °C, max	-	-	0.40
Total phenol content (ppm), max	0.5	0.5	0.5
Viscosity, cSt at 25 °C, max	-	-	5.0

1/ These maximum limits are as defined in Rule 102, South Coast Air Quality Management District regulations.

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2/ Samples of P-D-680 having satisfactory odor characteristics shall be used as reference standards.
3/ Test for three hours at 100 °C.

3.1.1 Appearance. The solvent shall be clear and free from suspended matter and undissolved water when observed at 15.6 - 25.6 °C.

3.2 Materials. The hydrocarbon solvent shall be a virgin grade or recycled solvent derived from petroleum distillates, fractions from reclaiming and re-refining processes, or a mixture of these fractions. The resultant solvent must be produced in such a manner as is necessary to meet the specified requirements.

3.3 Toxicity and carcinogenicity. The solvent shall have no adverse effects on human health when it is used as intended (see 6.1). The solvent shall contain no chemicals listed as carcinogens (see 6.9 and 6.10). Any carcinogenic components in the solvent in a concentration of 0.1 percent or greater by weight or by volume will be regarded as the presence of a carcinogen in the solvent.

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.

4.2 Inspection. Perform inspection in accordance with FED-STD-791, method 9601. Unless otherwise specified, all examinations and tests shall be performed at a temperature of 25 ±3 °C (77 ±5 °F) and at a relative humidity between 45 and 55 percent. Physical values specified in table I apply to the average of the determinations made on the samples.

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

a. Quality conformance inspection (see 4.4).
b. Inspection of preparation for delivery (see 4.6).

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4.4 Quality conformance inspection. The quality conformance tests shall consist of all the tests specified herein.

4.4.1 Lot. A lot shall consist of solvents from one batch or tank offered for delivery at one time. If material cannot be identified by batch or lot, a lot shall consist of not more than 10,000 gallons offered for delivery at one time.

4.4.2 Sampling for examination. A random sample of containers fully prepared for delivery shall be taken from each lot in accordance with MIL-STD-105. Sample size shall be determined by using MIL-STD-105, table I and table IIa, at special inspection level II. A lot shall be accepted when zero defects are found and rejected when one or more defects are found.

4.4.3 Sampling for tests. Sampling of a lot for test purposes shall be in accordance with ASTM D 4057 or D 4177.

4.5 Quality conformance tests. Quality conformance tests shall be conducted as specified in table II and 4.5.1 and 4.5.2, as applicable.

TABLE II. Quality conformance testing.

CHARACTERISTIC	ASTM METHODS	OTHER METHODS
Flash point	D 56	
Distillation	D 86	
Kauri-Butanol value	D 1133	
Allowable constituents, % volume		FED-STD-141, method 7356
Apparent specific gravity	D 1298	
Aniline point	D 611	
Color	D 156	
Odor	D 1296	
Copper corrosion	D 130	
Acidity	D 847	
Doctor test	D 235	
Vapor pressure	D 2879	
Total phenol content		EPA 420.1
Viscosity	D 445	

4.5.1 Non-volatile residue. When performing this test, sufficient ventilation shall be available to maintain the concentration of the solvent below the required exposure standards. Place 100 mL of solvent into a weighed porcelain dish. Evaporate the contents over a steam bath until there is no further evaporation. Then heat the dish and residue to constant weight in an oven set at 105 ±2 °C. Determine the weight of the non-volatile residue in the dish. Conduct the test in duplicate and report as mg per 100 mL solvent.

4.5.2 Total chlorine content. The total chlorine content of the solvent shall be determined by a gas chromatographic method, microcoulometric method, or by the use of a portable test kit for the quantitative analysis of chlorine (see 6.6). Nonconformance to table I shall constitute failure of this test.

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4.6 Inspection of preparation for delivery.

4.6.1 Quality conformance inspection of preparation for delivery.

4.6.1.1 Unit of product. For the purpose of inspection, a complete pack prepared for shipment shall be considered a unit of product.

4.6.1.2 Inspection lot. The inspection lot shall be as defined in 4.4.1, packed for shipment.

4.6.1.3 Sampling. Samples for examination of preparation for delivery shall be selected at random from each inspection lot in accordance with procedure prescribed in MIL-STD-105. Sample size shall be determined by using MIL-STD-105, table I and table IIa. A lot shall be accepted when zero defects are found and rejected when one or more defects are found.

4.6.1.4 Examination. Samples selected in accordance with 4.6.1.3 shall be examined for the defects listed below.

101. Unit containers not of the size(s) specified.
102. Unit containers not as specified in MIL-STD-290.
103. Intermediate containers, when required, not as specified in MIL-STD-290.
104. Quality and arrangement of unit containers positioned within intermediate containers, when required, not as specified in MIL-STD-290.
105. Quantity and arrangement of filled intermediate containers packed within exterior containers, when required, not as specified in MIL-STD-290.
106. Exterior containers, when required, not as specified in MIL-STD-290.
107. Marking not as specified herein and in MIL-STD-129 or MIL-STD-290.
108. Palletization, when required, not as specified in MIL-STD-147.

5. PREPARATION FOR DELIVERY

5.1 Packing. Unit containers shall be the size or sizes specified in 6.2 (see 6.3) and shall comply with the applicable requirements of MIL-STD-290 for level B, C, or commercial, as specified (see 6.2). Intermediate containers when required of the specified unit containers, shall be as specified therein. When exterior containers are required, they shall be in accordance with the level B, C, or commercial requirements of MIL-STD-290, as specified (see 6.2).

5.2 Marking. In addition to any special or identification markings required by the contract or purchase/delivery order, all containers shall be marked in accordance with MIL-STD-129 and, as applicable, MIL-STD-290.

5.3 Palletization. When specified (see 6.2), the packed dry cleaning and degreasing solvent shall be palletized in accordance with MIL-STD-147. NOTE: Palletized loads 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.)

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6.1 Intended use. This solvent is also known as "Mineral Spirits" or "Petroleum Spirits". It is used in the dry cleaning and the coatings industries. It is used in the military as a degreaser and cleaner for machine parts.

6.1.1 Type I. Type I (Stoddard solvent) is intended as a comparatively safe dry cleaning solvent. When type I solvent is used indoors, ventilation shall be sufficient to prevent the accumulation of vapors above required exposure limits.

6.1.2 Type II. Type II (high flash point solvent) is intended where a solvent with a higher flash point is desired. It is recommended over type I for safety and regulatory reasons. When type II solvent is used indoors, ventilation shall be sufficient to prevent the accumulation of vapors above required exposure limits.

6.1.3 Type III. Type III (low odor with very high flash point solvent) is intended to be used where confined atmospheric conditions require a cleaner that conforms to the federal Government's directives for reduced hazardous materials.

6.2 Acquisition requirements. Acquisition documents shall specify the following:

a. Title, number and date of this specification.
b. Type and quantity.
c. 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).
d. Level of packaging and packing required (see 5.1).
e. Any special markings (see 5.2).
f. When palletization is required (see 5.3).

6.3 National stock numbers, sizes, dash numbers. The national stock numbers (NSNs), sizes and dash numbers are listed in table III.

TABLE III. National stock numbers, sizes, dash numbers.

Type	Size/Unit of Issue	Military Symbol/ NATO Code	NSN	Dash Number
I	Bulk	SD-1/S-752	6850-00-264-9039	01
I	4 Ounce	SD-1/S-752	6850-00-281-3061	02
I	1 Quart	SD-1/S-752	6850-00-664-5685	03
I	1 Gallon (Gl)	SD-1/S-752	6850-00-281-1985	04
I	5 Gallon can (Cn)	SD-1/S-752	6850-00-264-9038	05
I	55 Gallon drum (Dr)	SD-1/S-752	6850-00-285-8012	06
II	Bulk	SD-1/S-753	6850-00-637-6135	07
II	1 Pint can	SD-1/S-753	6850-00-110-4498	08
II	5 Gallon can (Cn)	SD-1/S-753	6850-00-274-5421	09
II	55 Gallon drum (Dr)	SD-1/S-753	6850-00-285-8011	10
III	5 Gallon can (Cn)	SD-3/none	6850-01-331-3349	11
III	55 Gallon drum (Dr)	SD-3/none	6850-01-331-3350	12

6.4 International standardization. Certain provisions of this specification are the subject of international standardization agreement (NATO STANAG 1135, annex C). When amendment, revision, or cancellation of this specification is

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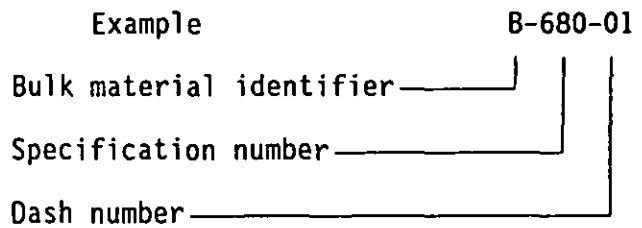
proposed which would affect or violate the international agreement concerned, the preparing activity will take appropriate reconciliation action through international channels, including departmental standardization offices, if required.

6.5 Disposal actions. Disposal of this product shall be in accordance with local, state and Federal regulations. Care should be taken to avoid mixing used P-D-680 with other waste materials, especially those containing halogenated solvents.

6.6 Material Safety Data Sheets. The 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 FED-STD-313.

6.7 Chlorine detection kit. A simple, disposable kit for the detection of total chlorine supplied by the Dexsil Corporation, Hamden, Connecticut, or its equivalent, may be used for the detection of total chlorine content. Directions accompanying the test kit shall be followed.

6.8 Part or identifying number (PIN). Dry cleaning and degreasing solvent for degreasing of machine parts and for dry cleaning, spot and stain removing under this specification shall be identified by a PIN consisting of a "B" prefix and a basic specification number, followed by the two digit dash number found in table III, as shown in the following example:



6.9 Definitions. The Occupational Safety and Health Administration (OSHA) definition of carcinogens are those chemicals/processes appearing in lists 1, 2A, and 2B of the International Agency for Research on Cancer (IARC)[1/]; substances known to be carcinogenic, substances reasonably anticipated to be carcinogenic and occupational exposures associated with a technological process known to be carcinogenic by the National Toxicology Program (NTP) Report on Carcinogens (latest annual report)[2/]; and OSHA regulated carcinogens.

6.10 Toxicological product formulations information. The contracting officer will require the contractor to have the toxicological product formulations and

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1/ Copies of these volumes may be found in medical libraries or through the World Health Organization, 1211 Geneva 27, Switzerland.

2/ Copies may be obtained from the Public Health Service, National Toxicology Program, Public Information Office, P.O. Box 12233, MD B2-04, Research Triangle Park, NC 27709.

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associated information available for review by the contracting activity to evaluate the safety of the material for the proposed use through the submission of the Material Safety Data Sheet detailed in FED-STD-313 (see 6.6).

6.11 Subject term (key word) listing.

140 °F solvent (type II)
200 °F solvent (type III)
Mineral spirits
Stoddard solvent (type I)
Petroleum spirits (USA)
Naphtha

6.10 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.

MILITARY INTERESTS:

Custodians

Army - ME
Air Force - 68

Review Activities

Army - AV, MD, MI, SM
Navy - AS
DLA - GS, DP, DS

User Activity

Navy - MC, SH

CIVIL AGENCY COORDINATING ACTIVITIES

GSA-FSS

PREPARING ACTIVITY:

Army - ME

Project 6850-1098

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintended of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein.

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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.

RECOMMEND A CHANGE:	1. DOCUMENT NUMBER P-D-6808	2. DOCUMENT DATE (YYMMDD) 921029

3. DOCUMENT TITLE Dry Cleaning and Degreasing Solvent

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 (if applicable) (2) AUTOVON	7. DATE SUBMITTED

8. PREPARING ACTIVITY

a. NAME Betty Taylor	b. TELEPHONE (Include Area Code) (1) Commercial (703) 704-3466	(2) AUTOVON 654-3466
c. ADDRESS (Include Zip Code US Army Belvoir RDE Center ATTN: SATBE-TSE Fort Belvoir, VA 22060-5606	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	