

METRIC
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P-D-680A  
September 9, 1988  
 SUPERSEDING  
 P-D-680  
 March 27, 1963

## 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 two types of petroleum distillates. The different types are referred to as 'Stoddard solvent' and as '140 °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) (NATO Symbol SD-1/S-752) |
| Type II | - High flash point (NATO) Symbol SD-2/5-753)          |

<p>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: STRBE-TSE, Fort Belvoir, VA 22060-5606 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.</p>
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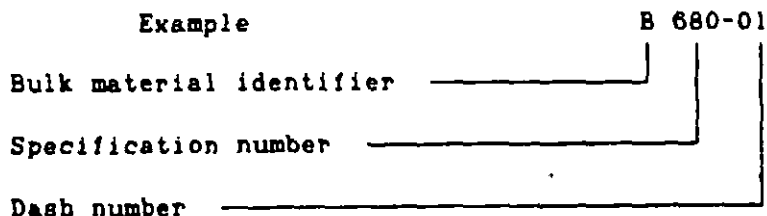
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FSC 6850

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1.3 Federal specification part numbers. 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 military part number 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:



## 2. APPLICABLE DOCUMENTS

2.1 Government publications. The issues of the following documents in effect on date of invitation for bids or solicitation of offers, form a part of this specification to the extent specified herein.

### Federal Standard:

- |             |  |
|-------------|--|
| FED-STD-141 | - Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling and Testing. |
| FED-STD-313 | - Material Safety Data Sheets, Preparation and the Submission of.                              |
| FED-STD-701 | - 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.)

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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 Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

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 93 - Test Methods for Flash Point by Pensky - Martens Closed Tester.
- 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 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 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 the American Society for Testing and Materials, 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)

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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 (except for associated detail specifications, specification sheets or MS standards), 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.

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, either type I or type II must be produced in such a manner as is necessary to meet the specified requirements.

TABLE I. Dry cleaning and degreasing solvent properties.

CHARACTERISTIC	TYPE I	TYPE II
Flash point, °C	38.0	60.0
Distillation, °C:		
Initial boiling pt., min	149	177
50% Recovered, max	report	report
Dry point, °C	208	211
Aniline point, °C	57 to 74	57 to 74
Kauri-butanol value	29 to 45	29 to 45
Allowable Constituents, (% by volume) <sup>1/</sup> :		
(a) Solvent with olefinic or cyclo-olefinic unsaturation, max	5	5
(b) Aromatic compounds with eight or more carbon atoms, except ethylbenzene, max	8	8
(c) Total of ethylbenzene, toluene, and branched chain ketones, max	20	20
(d) Total of (a) + (b) + (c)	20	20
Total chlorine content (ppm), max	500	500
Apparent specific gravity	0.754 to 0.820	0.754 to 0.820

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TABLE I. Dry cleaning and degreasing solvent properties. (cont'd)

CHARACTERISTIC	TYPE I	TYPE II
Non-volatile residue (mg/100 mL) max	10	10
Color, min	25	25
<sup>2/</sup> Odor	Characteristic & non-residual	Characteristic & non-residual
Corrosion, copper, max <sup>3/</sup>	2A	2A
Acidity	neutral	neutral
Doctor test	negative	negative

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

<sup>2/</sup> Samples of P-D-680 having satisfactory odor characteristics are to be used as reference standards.

<sup>3/</sup> Test for three hours at 100 °C.

3.3 Toxicity. The solvent shall have no adverse effects on human health when it is used as intended (see 6.1). Material Safety Data Sheets shall be prepared in accordance with the most recent version of FED-STD-313. The completed form shall be submitted to the pertinent Government offices listed in FED-STD-313.

#### 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.

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4.2 Inspection. Perform inspection in accordance with method 9601 of FED-STD-791.

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).

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 at inspection level II and acceptable quality level (AQL) shall be not more than 1.0 percent defective.

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	Test Method No. FED-STD-141	Test Method No. ASTM Method
Flash point		
Type I		D 56
Type II		D 93
Distillation		D 86
Kauri-Butanol Value		D 1133
Allowable Constituents, X Volume	7356	
Apparent specific gravity		D 1298
Aniline point		D 811
Color		D 156
Odor		D 1296
Copper corrosion		D 130
Acidity		D 847
Doctor test		D 235

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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  $105 \pm 2$  °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 GLC mass spectrophotometer or by the use of a portable test kit for the quantitative analysis of chlorine (see 8.7), such as the 'Clor-D-Tect 1000' by Dexsil Corporation, or an equivalent kit with an accuracy of  $\pm 100$  ppm in the range 0 to 4000 ppm chloride ion. Nonconformance to table I shall constitute failure of this test.

#### 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.

4.6.1.4 Examination. Samples selected in accordance with 4.6.1.3 shall be examined for the defects listed below. AQL shall be 1.0 percent defective.

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-209.
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

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5.1 Packaging and packing. Unit containers shall be the size or sizes specified in 6.2 (see 8.3) and shall comply with the applicable requirements of MIL-STD-290 for level B or C, 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 or C 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.)

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.

6.2 Acquisition requirements. Acquisition documents shall specify the following:

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



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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	6850-00-264-8012	06
II	Bulk	SD-2/S-753	6850-00-637-6135	07
II	1 Pint can	SD-2/S-753	6850-00-110-4498	08
II	5 Gallon can (Cn)	SD-2/S-753	6850-00-274-5421	09
II	55 Gallon drum (Dr)	SD-2/S-753	6850-00-295-8011	10

6.4 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), 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.

6.5 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 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.

6.6 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.

6.7 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.

6.8 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 to determine the 500 ppm limit shall be followed.

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6.9 Subject term (key word) listing.

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

6.10 Changes from previous issue. The margins of this specification are marked with asterisks (or vertical lines) 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.

MILITARY INTERESTS:Custodians

Army - ME  
 Navy - SH  
 Air Force - 68

CIVIL AGENCY COORDINATING ACTIVITIES

GSA-FSS

Review Activities

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

PREPARING ACTIVITY:

Army - ME

User Activity

Navy - MC .

Project 6850-0795

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

## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER

P-D-680A

2. DOCUMENT TITLE

Dry Cleaning and Degreasing Solvent

3a. NAME OF SUBMITTING ORGANIZATION

4. TYPE OF ORGANIZATION (Mark one)

 VENDOR USER MANUFACTURER OTHER (Specify) \_\_\_\_\_

b. ADDRESS (Street, City, State, ZIP Code)

5. PROBLEMS/ISSUES

a. Paragraph Number and wording:

b. Recommended wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER (Last, First, MI) - Optional

8. WORK TELEPHONE NUMBER (Include Area Code) - Optional

9. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional

8. DATE OF SUBMISSION (YYMMDD)

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

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**NOTE:** This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification 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.

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