MILITARY SPECIFICATION

CARBON BLACK

This specification is approved for use by the Naval Air Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE.

1.1 Scope. This specification establishes the requirements for one type of carbon black.

2. APPLICABLE DOCUMENTS.

2.1 Issues of documents. The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this specification to the extent specified herein.

STANDARDS

MILITARY

MIL-STD-129 Marking for Shipment and Storage.

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specified procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, NavalAir Engineering Center, Engineering Specifications and Standards Department (ESSD), Code 93, Lakehurst, NJ 08733, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 6810

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

STANDARDS

American Society for Testing and Materials (ASTM)

ASTM-D-1506	Standard Method of Testing Carbon Black Ash Content.
ASTM-D-1512	Standard Method of Testing Carbon Black pH Value.

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

3. REQUIREMENTS.

3.1 Chemical and physical properties. Chemical and physical properties of the carbon black shall conform to Table I.

TABLE I. Chemical and physical properties.

Property	Minimum	Maximum
Ash, percent	...	0.50
pH	7.0	9.7
Surface area, m^2/g	5.0	9.0
Volatiles, percent	...	0.5

3.2 Stability. When packaged in accordance with 5.1, the carbon black shall meet the requirements of this specification for a minimum of 12 months. This may be extended in additional 12-month increments by retesting for volatiles for conformance to Table I.

3.3 Toxic products and safety. Safety regulations and guidelines applicable to the use of carbon black should be complied with to preclude personal injury and damage to equipment and facilities.

3.4 Workmanship. Workmanship shall be such that the carbon black is uniform, of consistent high quality, and free from contamination.

4. QUALITY ASSURANCE PROVISIONS.

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor shall be responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the contractor may utilize his own facilities or any other commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Sampling. The lot shall be sampled in accordance with Table II.

TABLE II. Sampling plan.

Number of containers in lot	Number of containers sampled (primary sample)	Number of composite samples
100 or more	10% (nearest whole number)	5
51 - 99	10	4
11 - 50	10	3
1 - 10	All	2

4.2.1 Primary samples. Physical property tests shall be run on each sample (see Table II). The material may be sampled by use of a clean metallic tube or scoop. The smallest sample size that is consistent with test requirements shall be taken. The minimum sample size shall be two ounces. Glass or plastic containers may be used. Each sample shall be labeled with date, lot number, and manufacturer's container identification number. Failure of any primary sample to pass all of the physical properties tests herein shall result in rejection of the lot represented.

4.2.2 Composite samples. Chemical property tests shall be run on each composite sample. Divide the primary samples equally into the number of composites shown in Table II. Blend each composite thoroughly

by manipulation of the container. Label each composite with Roman numerals, also include date, lot numbers, and manufacturer's container identification numbers. The remainder of the primary samples shall be retained pending acceptance or rejection of the lot. Failure of any composite sample to pass all of the chemical-properties tests herein shall result in rejection of the lot represented.

4.3 Quality conformance inspections and tests. Acceptance inspections and tests shall consist of the following:

a. Tests of Table I properties (see 4.4).

b. Inspection of filled containers (see 4.5.1).

c. Visual inspection (see 4.5.2).

4.4 Test methods. Tests shall be performed using apparatus, reagents, and procedures specified herein. The use of alternate apparatus, reagents, or procedures shall require prior written approval of the procuring activity.

4.4.1 Ash content. Ash content shall be determined in accordance with ASTM-D-1506.

4.4.2 pH test. pH shall be determined in accordance with ASTM-D-1512.

4.4.3 Surface area.

4.4.3.1 Apparatus.

a. Platinum crucible with cover, 15-ml (type used in coal analysis; 0.1 millimeter (mm) diameter hole shall be punched in cover).

b. Iodine flask, 250-ml, with standard taper stopper, or equal.

4.4.3.2 Reagents.

a. Iodine solution, 0.01 normal (N)

b. Sodium thiosulfate solution, 0.01 N

c. Thyodene (Magnus Chemical Company), or equal

4.4.3.3 Determination of surface area. Fill a crucible with sample to approximately 0.25 inch from top, cover tightly and heat in a muffle furnace at 925 ±20°C for 7 minutes. Remove the crucible and sample from furnace and cool in a desiccator with the cover still in place. Remove

and discard 8.4 to 12.7 mm of top layer of sample. Accurately weigh 2.0 grams (gm) of the remaining sample into glass-stoppered flask. Add 100 ml of iodine solution, stopper, transfer to a mechanical shaker and shake for 30 minutes. Transfer the solution to a centrifuge tube, stopper and centrifuge until solution is clear. Using a buret, transfer exactly 40 ml of centrifuged solution to iodine flask and titrate with sodium thiosulfate solution until nearly all of free iodine is neutralized. Add 0.5 gm of Thyodene and complete the titration. Run a blank, using 40 ml of iodine solution.

Calculation:

$$\text{Surface area, square meters/gm} = \frac{(A \times 0.937) - 4.5}{W}$$

Where

$$A = \frac{B - C}{B} \times 100$$

B = volume of sodium thiosulfate solution used to titrate blank, ml

C = volume of sodium thiosulfate solution used to titrate sample, ml

W = weight of sample, gm

Report the surface area to the nearest 0.1 square meter/gm.

4.4.4 Volatiles.

4.4.4.1 Apparatus. Glass-stoppered weighing bottle.

4.4.4.2 Determination of volatiles. Weigh accurately 4.0 gm of sample in a tared, glass-stoppered weighing bottle. Heat the unstoppered bottle and sample for 1 hour at 105°C, replace stopper, cool in a desiccator and weigh.

Calculations:

$$\text{Percent volatiles} = \frac{100\ (A - B)}{W}$$

Where

A = weight of stoppered bottle and sample, gm

B = weight of stoppered bottle and dried sample, gm

W = weight of sample, gm

Report the volatiles to the nearest 0.1 percent.

4.5 Examinations.

4.5.1 Inspection of filled containers. All filled containers shall be inspected prior to shipment or use for accuracy of markings and for defects in containers and closures. All defective containers and closures shall be repaired or replaced, and contents therein shall be reinspected prior to shipment or use.

4.5.2 Visual inspection. All samples shall be visually inspected to determine conformance to the requirements of 3.4.

4.6 Records. Certification and test data shall be prepared as required by the procuring activity (see 6.2.2).

5. PACKAGING.

5.1 Packaging and packing. Unless otherwise specified in the contract or purchase order (see 6.2.1), packaging of the carbon black shall be in accordance with commercial practice to ensure carrier acceptance and shall be of such construction and materials that the contents will be adequately protected against loss or contamination.

5.2. Marking. Unless otherwise specified in the contract or purchase order (see 6.2.1), each shipping container shall be marked in accordance with the requirements of MIL-STD-129. Container marking shall include the following:

a. The supplier's lot number.

b. Procuring activity purchase order number.

c. Container identification number (applied in numerical sequence as the containers are filled).

d. Date of manufacture.

e. Manufacturer's Code Ident.

f. Net and tare weight of the container.

g. Material identification.

6. NOTES AND CONCLUDING MATERIAL.

6.1 Intended use. The material described herein is intended to be used as an ingredient in rocket motor case liner formulations.

6.2 Ordering data.

6.2.1 Procurement requirements. Procurement documents should specify the following:

a. Title, number and date of this specification.

b. Responsibility for inspection and inspection facilities if different than 4.1.

c. Special packaging, packing, or shipping requirements, if applicable (see Section 5).

6.2.2 Data requirements. When this specification is used in a procurement which incorporates a Contract Data Requirements List (DD Form 1423) and invokes the provisions of 7-104.9(n) of the Defense Acquisition Regulations (DAR), the data requirements identified below will be developed as specified by an approved Data Item Description (DID) (DD Form 1664) and delivered in accordance with the approved DD Form 1423 incorporated into the contract. When the provisions of DAR-7-104.9(n) are not invoked, the data specified below will be delivered by the contractor in accordance with the contract requirements. Deliverable data required by this specification is cited in the following paragraphs:

Paragraph	Data Requirement	Applicable DID
4.6	Certification	UDI-A-23264B
	Test Data	DI-T-4024

(Copies of DIDs required by the contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

6.3 Definitions.

6.3.1 Lot. At place of manufacture, a lot consists of one batch (6.3.2) or a uniform blend of two or more batches. At place of delivery,

a lot consists of carbon black from one supplier's lot received in a single shipment. Partial shipments may be considered as a single shipment by the procuring activity.

6.3.2 Batch. A batch consists of carbon black made as one unit in an unchanged manufacturing process.

6.4 Suggested source of supply. A product that has met the requirements of this specification in past procurement actions is marketed by R. T. Vanderbilt Company, Code Ident 88596, as Thermal Black, N-991. This information is for the convenience of the procuring activity and is not to be construed as a waiver of any requirement of this specification nor as any limitation of additional potential sources of supply.

Preparing activity:
Navy - AS

(Project 6810-NB27)

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DOCUMENT IDENTIFIER *(Number)* AND TITLE
MIL-C-85496(AS), CARBON BLACK

NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER

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1. ☐ HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? ☐ IS ANY PART OF IT TOO RIGID, RESTRICTIVE, LOOSE OR AMBIGUOUS? PLEASE EXPLAIN BELOW.

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2. REMARKS

SUBMITTED BY *(Printed or typed name and address — Optional)*

TELEPHONE NO.

DATE

DD FORM 1426 1 OCT 76

Replaces edition of 1 Jan 72 which may be used.

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