

MIL-C-5651D  
 26 September 1985  
 SUPERSEDING  
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 2 March 1977

## MILITARY SPECIFICATION

### CORD, ELASTIC, EXERCISER AND SHOCK ABSORBER, FOR AERONAUTICAL USE

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

#### 1 SCOPE

1.1 Scope. This specification covers the requirements for three types of elastic shock absorbing and exerciser cord for aeronautical use.

1.2 Classification. The elastic cord shall be furnished in the following types, as specified (see 6.2.1):

Type	Description
I	Straight cord with double braided cover (shock absorbing).
II	Endless ring (Bungee) with double braided cover (shock absorbing).
III	Straight cord with single braided cover (exerciser cord).

#### 2 APPLICABLE DOCUMENTS

##### 2.1 Government documents.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Systems Engineering and Standardization Department (Code 93), Naval Air Engineering Center, 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.
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FSC 8305

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

## MIL-C-5651D

2.1.1 Specifications, standards, and handbooks Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

## SPECIFICATIONS

## FEDERAL

- |            |   |   |
|------------|---|---|
| MMM-A-260  | - | Adhesive, Water-Resistant, (For Sealing Water-proofed Paper). |
| PPP-B-636  | - | Boxes, Shipping, Fiberboard.                                  |
| PPP-B-1055 | - | Barrier Material, Waterproofed, Flexible.                     |
| PPP-T-60   | - | Tape, Packaging, Waterproof.                                  |
| PPP-T-76   | - | Tape, Packaging, Paper (For Carton Sealing)                   |

## MILITARY

- |           |   |  |
|-----------|---|--|
| MIL-B-131 | - | Barrier Materials, Watervaporproof, Flexible, Heat-Sealable. |
|-----------|---|--|

## STANDARDS

## MILITARY

- |             |   |  |
|-------------|---|--|
| MIL-STD-105 | - | Sampling Procedures and Tables for Inspection by Attributes. |
| MIL-STD-129 | - | Marking for Shipment and Storage.                            |

(Copies of specifications, standards, handbooks, drawings, and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

## UNIFORM CLASSIFICATION COMMITTEE, AGENT

## Uniform Freight Classification Rules

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order or 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.

## MIL-C-5651D

## 3. REQUIREMENTS

3.1 First article. When specified, samples shall be subjected to first article inspection (see 4.3 and 6.3).

3.2 Materials.

3.2.1 Strands. The strands shall be made from natural, synthetic, or a mixture thereof of synthetic natural rubber compound having such qualities that, when encased in a braided cover (Types I and II double braided, Type III single braided), the finished cord shall conform to the requirements specified herein. Reclaimed rubber shall not be used.

3.2.2 Yarns. The yarns for the braid shall be spun from a good grade and staple of cotton that shall be free of imperfections and impurities.

3.3 Design and construction. The elastic shock absorber cord (Types I and II) and the elastic exerciser cord (Type III) shall be composed of multiple strands tightly encased within a double layer of cotton braid for Types I and II and a single layer of cotton braid for Type III.

3.3.1 Strands. The strands shall be continuous throughout the length of the cord and, in a given cord, shall be of uniform size and configuration. Strands shall be thoroughly treated with soapstone or talc to prevent them from adhering to each other in the finished cord.

3.3.2 Braid. All cord shall be braided with a sufficient number of ends that, when the cord is elongated 100 percent, the braid shall be tight and prevent dirt from entering between the individual yarns of the braid. The minimum number of ends in the braid for all cords shall be as specified in Table I.

3.3.2.1 Type I braid. The Type I cord shall be double braided from natural color cotton ply yarns. The outer braid shall consist of glazed (polished) yarns and the inner braid shall consist of soft finished yarns.

3.3.2.2 Type II braid. Type II bungee ring cord shall be double braided from natural color cotton ply yarns. The inner and outer braid shall be fabricated from glazed yarns.

3.3.2.3 Type III braid. Type III shall be a single cotton braid consisting of ply yarns of a colorfast color specified by the acquisition activity (see 6.2.1).

3.4 Size and tolerance.

3.4.1 Diameters. The elastic cord shall be furnished in the diameters specified in Table I. The tolerances, as applicable, shall be as follows:

Types I and II: +.047, -0 inch (+0.119, -0 cm).

Type III: +.031, -0 inch (+0.079, -0 cm).

## MIL-C-5651D

3.4.2 Lengths. Unless otherwise specified (see 6.2.1), the cord lengths shall be as specified in Table II.

3.5 Physical properties. The physical properties of the cords shall conform to Table III. Type II bungee ring cord shall meet all the requirements for Type I cord in addition to those for Type II.

3.6 Age limitation. Elastic cord furnished under this specification shall be not more than six (6) months old from date of manufacture to date of delivery (see 6.2.2).

3.7 Product identification. The elastic cord shall be identified as to type and date of manufacture by using dyed yarns as part of the outer braid. Type I cords shall be identified by two dyed ends indicating year of manufacture (see 3.7.1.1) and a third indicating quarter of manufacture (see 3.7.1.2). Type III cord shall utilize three dyed ends for the year (see 3.7.1.1) and a fourth dyed end for the quarter of manufacture (see 3.7.1.2). The identification ends shall be separated by one or two natural color or olive drab dyed ends.

3.7.1 Identification yarn colors.

3.7.1.1 Year of manufacture. The following colorfast identification yarn colors shall be used to distinguish the year of manufacture:

1982 - Red  
1983 - Blue  
1984 - Yellow  
1985 - Black  
1986 - Green

For succeeding years, this cycle shall be repeated.

3.7.1.2 Quarter of manufacture. The following colors shall be used to distinguish the quarter year of manufacture:

January through March - Red  
April through June - Blue  
July through September - Green  
October through December - Yellow

3.8 Workmanship. Workmanship shall be in accordance with high grade practice covering this class of material.

## MIL-C-5651D

## 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.

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

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

4.3 First article inspection. The first article inspection of the cords shall consist of tests and examinations for all the requirements of this specification.

4.3.1 First article samples. Unless otherwise specified, as soon as practicable after the award of the contract or order, the contractor shall submit 80 feet (24 meters) for each type and size ordered in the contract. The samples shall be representative of the construction, workmanship, components and materials to be used during production. When a contractor is in continuous production of these cords from contract to contract, submission of further first article inspection samples, on the new contract, may be waived at the discretion of the acquiring activity (see 6.2.1). Approval of the first article inspection samples or the waiving of the first article inspection does not waive the requirements for performing the quality conformance inspection. The first article inspection samples shall be furnished to the Government as directed by the contracting officer (see 6.2.1). The first article inspection sample shall be identified by securely attached tags or labels durably marked with the following information:

Sample for First Article Inspection  
 CORD: ELASTIC, EXERCISER AND SHOCK ABSORBER,  
 FOR AERONAUTICAL USE  
 Type and size as applicable  
 Name of manufacturer  
 Name of distributor (if applicable)  
 Product designation (manufacturer's)  
 Date of manufacture  
 Submitted by (name) (date) for first article inspection  
 in accordance with the requirements of MIL-C-5651D.

## MIL-C-5651D

4.3.2 Test report. Two copies of the contractor's test report, containing complete test data for the end item and for each component required herein and referring specifically to the applicable paragraphs, shall be submitted with the first article inspection sample.

4.4 Quality conformance inspection.

4.4.1 Lot formation. Unless otherwise specified, a lot shall consist of all the elastic cord of the same type and size produced under essentially the same manufacturing condition and from the same material, at one plant, and ready for inspection at the same time. Unless otherwise specified, the lot size shall be expressed as the total number of feet (m) in the lot.

4.4.2 Sampling.

4.4.2.1 Dimensional. The unit of product for this inspection shall be one coil, core, or spool of cord. The sample size shall be as specified in Table IV. Each unit shall be examined as specified in 4.4.3.1.

4.4.2.2 Visual. The sample size shall be determined in accordance with Inspection Level I of MIL-STD-105. The unit of product shall be one (1) foot (0.3 m). An approximately equal number of units of product from the cores, coils, or spools, selected as specified in 4.4.2.1, shall be used for the visual sample. Each unit shall be examined as specified in 4.4.3.2.

4.4.2.3 Physical properties. The sample size shall be determined in accordance with Inspection Level S-1 of MIL-STD-105. The unit of product shall be 10 feet (3 m). Each unit shall be examined as specified in 4.4.3.3.

4.4.2.4 Packaging. A quantity of shipping containers prepared for delivery, just prior to closure, shall be randomly selected from each lot in accordance with Inspection Level I of MIL-STD-105. The lot size for purposes of sampling shall be the number of shipping containers in the lot. Examination shall be as specified in 4.4.3.4.

4.4.3 Inspection procedure.

4.4.3.1 Dimensional. Units of product selected as specified in 4.4.2.1 shall be examined for length as follows: Any individual length found to be less than the specified minimum length (50 feet) (15 m) or any total length less than 2 feet (0.6 m) below the length specified on the package shall be considered a defect. The diameter of the cord shall be measured at least 5 times during the length measurement. The acceptance number shall be as specified in Table IV. In addition, when the actual total length in the entire sample is less than the total specified on the packages, the entire lot shall be considered unacceptable.

4.4.3.2 Visual. Units of product selected as specified in 4.4.2.2 shall be examined to the requirements specified in Table V. The Acceptable Quality Level (AQL) shall be 0.15 for major and 1.0 total combined (major plus minor) defects per 100 units of product (feet) (30 units of product m).

## MIL-C-5651D

4.4.3.3 Physical properties. Each unit of product selected as specified in 4.4.2.3 shall be examined to the requirements specified in Table VI. Nonconformance of any unit of product to a single applicable requirement shall be cause to reject the lot represented by the sample.

4.4.3.4 Packaging inspection. Shipping containers selected as specified in 4.4.2.4 shall be examined for conformance to Table VII and the requirements of Section 5 of this specification. The AQL shall be 2.5 percent defective. In addition, shipping containers fully prepared for delivery shall be examined for closure defects.

#### 4.5 Test conditions.

4.5.1 Standard conditions. Standard conditions shall be  $23 \pm 3^{\circ}\text{C}$  ( $73.4 \pm 5^{\circ}\text{F}$ ) and a relative humidity of  $50 \pm 5$  percent.

4.5.2 Conditioning. Unless otherwise specified herein, all test fixtures and measurement gauges shall be maintained at standard conditions for 24 hours prior to tests. In addition, all cord shall be conditioned for at least 7 days from the date of manufacture before testing.

4.5.3 Reporting of test results. Unless otherwise specified in the applicable test method, test results shall be reported as the average of all values obtained. However, each individual value shall be noted in the test report and shall conform to the specified requirement. When comparison of initial and after conditioning values are indicated, the comparison shall be determined on the reported average.

#### 4.6 Test methods.

##### 4.6.1 Construction details.

4.6.1.1 Visual. The elastic cord shall be carefully examined to determine conformance with the requirements for materials, workmanship, construction, and marking (year and quarter of manufacture).

4.6.1.2 Dimensions. The diameter of the cord shall be measured at 5 different locations. The average value shall be reported.

4.6.1.3 Weight. A  $12 \pm 0.031$  inch ( $30 \pm 0.08$  cm) length of cord shall be weighed to the nearest 0.1 gram. Weight in pounds per 100 feet (kilograms per 30 m) of cord shall be determined as follows:

W E 453.6 x100 = Weight in pounds per 100 feet.

W E 10 = Weight in kilograms per 30 meters.

Where:

W = Weight in grams.

## MIL-C-5651D

4.6.2 Tensile properties.

4.6.2.1 Specimen preparation. Three lengths of cord, at least 12 inches (30 cm) long, shall have each end tied with a slip knot using cord material of greater strength than the elastic cord. Two inch (5 cm) bench marks shall be located approximately equidistant from the midpoint of the cord.

4.6.2.2 Procedure. One end loop shall be attached to the stationary pin and the opposite end to the movable head of a tensile testing apparatus. In the event it is not possible to grip large cord sizes by this method, split drum type grips shall be used. The rate of jaw separation shall be 20 inches (50 cm) per minute. The load, in pounds (kilograms), required to produce elongations of 50, 75, 100 and 125 percent and the breaking point shall be recorded. Ultimate elongation shall be determined from the following:

$$\text{Ultimate elongation \%} = \frac{A - B}{B} \times 100$$

Where:

A = Bench mark length at break (inch) (cm).

B = Initial bench mark length (inch) (cm).

The results of all the above tensile properties shall be reported as the average initial value.

4.6.3 Drift and set.

4.6.3.1 Specimen preparation. Three specimens shall be prepared as specified in 4.6.2.1. Each specimen shall be fitted within a drift apparatus (a device which maintains an applied elongation), attached to the tensile testing machine, and extended to 100 percent elongation. The load in pounds (kilograms) shall be recorded (A), and the drift apparatus engaged to sustain the elongation of the cord. The entire apparatus shall then be removed from the tensile machine.

4.6.3.2 Drift determination. The elongated specimens shall be conditioned 16 + 0.25 hours at standard conditions (see 4.5.1). Upon completion of the conditioning period, the drift apparatus shall be re-attached to the tensile testing machine and 50 percent of the initial load (A) applied. The drift apparatus shall be disengaged, allowing the specimen to relax, followed by loading to 100 percent elongation. The load, in pounds (kilograms), (B) shall be recorded. Drift (percent loss in tension) shall be calculated as follows:

$$\text{Percent drift} = \frac{A - B}{B} \times 100$$

Where:

A = Initial load (pounds) (kilograms).

B = After conditioning load (pounds) (kilograms).



## MIL-C-5651D

4.6.3.3 Set determination. Upon completion of 4.6.3.2, the specimen shall be removed from the drift apparatus and allowed to relax for 10 minutes. The distance between bench marks shall then be measured. Percent set shall be calculated as follows:

$$\text{Percent set} = \frac{A - B}{B} \times 100$$

Where:

A = After conditioning, bench mark distance (inch) (cm).

B = Initial bench mark distance (inch) (cm) (see 4.6.3.1).

#### 4.6.4 Flexure.

4.6.4.1 Test conditions. Two specimens of each type I and III cords and size shall be tested at  $70 \pm 1^\circ\text{C}$  ( $158 \pm 2^\circ\text{F}$ ). A length of cord, at least 18 inches (45 cm) long, with a 10 inch (25 cm) bench mark centrally located along the lengthwise axis, shall constitute one test specimen. The specimen shall be installed in a flex apparatus equipped with a movable grip which reciprocates to produce the elongations required below. The apparatus shall be capable of maintaining the test temperature.

4.6.4.1.1 Type I. Type I specimens shall be elongated from a minimum 10 percent to a total of 50 percent elongation and return per cycle at a flexing frequency of 30 cycles per minute.

4.6.4.1.2 Type III. Type III specimens shall be elongated from a minimum of 10 percent to a total of 100 percent elongation and return per cycle at a flexing frequency of 60 cycles per minute.

4.6.4.2 Evaluation. The flexing test shall continue until the specimen fails or the specified cycles (see Table III) are completed. In addition, each specimen that successfully completes the flexing test shall show no evidence of failure of individual strands or braid.

#### 4.6.5 Low temperature properties.

4.6.5.1 Percent change in load. Six specimens shall be prepared as specified in 4.6.2.1. Three specimens shall be loaded to 100 percent elongation (50 percent for 0.75 inch (1.91 cm) diameter) at room temperature. The rate of jaw separation shall be 2 inches (5 cm) per minute. The load shall be recorded and averaged. The remaining specimens shall be exposed at  $-40 \pm 1^\circ\text{C}$  ( $-40 \pm 2$  degrees F) for  $5 \pm 0.25$  hours. The load required to produce the applicable elongation shall be determined while the specimens are at the exposure temperature. The load, in pounds (kilograms), shall be recorded and averaged. Percent change in load shall be calculated as follows:

## MIL-C-5651D

$$\text{Percent change in load} = \frac{A - B}{B} \times 100$$

Where:

A = Load, in pounds (kilograms), at  $-40^{\circ}\text{C}$  (average of 3 determinations).

B = Load, in pounds (kilograms), initial (average of 3 determinations).

4.6.5.2 Set. Percent set at low temperature ( $-40^{\circ}\text{C}$ ) shall be determined by maintaining the load required to produce the low temperature elongation in 4.6.5.1 for a period of 5 minutes. The load shall be released and the distance between the bench marks measured after one minute (after conditioning distance). Percent set shall be calculated as specified in 4.6.3.3.

#### 4.6.6 Heat aging properties.

4.6.6.1 Exposure conditions. Five lengths of elastic cord, at least 18 inches (45 cm) long, shall be exposed in a circulating air oven at  $70 \pm 1^{\circ}\text{C}$  ( $158 \pm 2^{\circ}\text{F}$ ) for 7 days  $\pm$  1 hour. After the heat cycle, the lengths of cord shall be removed from the oven and allowed to remain at standard conditions (see 4.5.1) for a minimum of 20 hours before initiation of tests.

4.6.6.2 Tensile tests. Testing shall be in accordance with 4.6.2. Three lengths of cord exposed as specified in 4.6.6.1 shall be used to prepare three specimens in accordance with 4.6.2.1. All results shall be averaged and reported as the percent change from the initial values. Calculation shall be as follows:

$$\text{Percent change} = \frac{A - B}{B} \times 100$$

Where:

A = After aging, load in pounds (kilograms) at 100 percent elongation, breaking strength or ultimate elongation, as applicable (average of values).

B = Initial averaged values (from 4.6.2.2).

4.6.6.3 Flex test. The remaining two lengths of cord from 4.6.6.1 shall be subjected to the flex test of 4.6.4. Number of cycles shall be as specified in Table III.

## MIL-C-5651D

## 5. PACKAGING

5.1 Preservation. Preservation shall be Level A or Commercial, as specified (see 6.2.1).

5.1.1 Level A. Interior packages shall consist of reels or spools of the elastic cord in lengths specified in Table II. Each reel or spool shall be wrapped in kraft paper and overwrapped or bagged in barrier material conforming to PPP-B-1055 or MIL-B-131, Class 2. The barrier material shall be sealed using tape conforming to PPP-T-60 or PPP-T-76 or adhesive conforming to MMM-A-260. When applicable, the barrier material may be heat sealed.

5.1.2 Commercial. Cords shall be preserved in accordance with the manufacturer's commercial practice.

5.2 Packing. Packing shall be level A, B, or C, as specified (see 6.2.1).

5.2.1 Level A. Interior packages and coils shall be packed in fiberboard shipping containers conforming to Type CF or SF, Class Weather Resistant, Style FOL of PPP-B-636. Net weight of the contents shall not exceed 65 pounds (30 kilograms). Closure shall be in accordance with the appendix of PPP-B-636.

5.2.2 Level B. Interior packages and coils shall be packed in fiberboard shipping containers conforming to Type CF or SF, Class Domestic, Style FOL of PPP-B-636. Net weight of the contents shall not exceed 65 pounds (30 kilograms). Closure shall be in accordance with the appendix of PPP-B-636.

5.2.3 Level C. Interior packages and coils shall be packed in containers of the size and kind commonly used for the purpose in a manner that will insure acceptance by common carrier and safe delivery at destination. Shipping containers shall comply with the Uniform Freight Classification Rules or regulations of other carriers as applicable to the mode of transportation.

5.3 Marking. In addition to markings required by the contract or order, spools, coils, reels, interior packages, and shipping containers shall be marked in accordance with MIL-STD-129.

5.3.1 Additional Markings. A tag shall be attached to the cord on each spool, coil, reel, or other container. The tag shall be durable and shall be attached to the cord until it is completely expended. The tag shall include the following:

CORD, ELASTIC, EXERCISER OR SHOCK ABSORBER  
MIL-C-5651D  
TYPE  
SIZE  
QUANTITY (FEET, METERS)  
CONTRACT OR ORDER NUMBER  
MANUFACTURER'S DESIGNATION  
NATIONAL STOCK NUMBER

## MIL-C-5651D

## 6. NOTES

6.1 Intended use. The elastic cord is intended for use as follows:

Types I and II - Shock mount installations.

Type III - Opening elastic on parachute packs, camera or instrument cradle mounts, airship valve control lines and where a shock absorbing cord of low initial tension is required.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type required (see 1.2)
- c. Size required (diameter) (see Table I).
- d. Length.
- e. Whether first article is required (see 3.2, 4.3.1 and 6.3).
- f. Name and address of activity to conduct first article inspection (see 4.3.1).
- g. Levels of preservation-packaging and packing (see 5.1).

6.2.2 Data requirements. When this specification is used in an acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL), the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved CDRL incorporated into the contract. When the provisions of FAR 52 209 are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification is cited in the following paragraphs:

<u>Paragraph no.</u>	<u>Data requirement</u>	<u>Applicable DID no.</u>
3.6	Certificate of compliance for the age of materials and components	DI-E-2121
4.3.1	Inspection and test reports.	DI-T-5329

## MIL-C-5651D

(Copies of data item descriptions required by contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

### 6.3 First article instructions.

6.3.1 Testing instructions. When a contractor is in continuous production of the cord from contract to contract, consideration should be given to waive first article inspection (see 4.3.1). When inspection is required the following shall apply:

- a. Rebranded products shall be subject to first article inspection.
- b. First article approval shall be granted only to the plant producing the sample. Separate sets of data are required for each plant.
- c. First article testing may be performed at the manufacturer's or distributor's facility under the supervision of an authorized Government representative. Optionally, commercial laboratories may be utilized when acceptable to the Government. Forty feet (12 m) of the first article sample prepared for 4.3 shall be used for these tests.

6.3.2 Report instructions First article certified tests reports shall include the following:

- a. Name and address of manufacturer.
- b. Plant location.
- c. Product designation.
- d. When rebranded, include name and address of distributor and distributor's product designation.
- e. Tabulation of test results in accordance with this specification. Include requirements and test method paragraph numbers.
- f. Signature of responsible official (manufacturer, distributor, or commercial laboratory, as applicable) attesting to the validity of the data presented.
- g. Signature of authorized Government representative approving the first article report.

MIL-C-5651D

**6.3.3 Distribution of report.** In addition to the distribution required by the contract or order, the following distributions shall be made:

- a. One copy and 40 feet (12 m) of the first article sample from 4.3 shall be forwarded to the Commander, Naval Air Development Center, Code 6062, Warminster, PA 18974.
- b. One copy to the Commander, Naval Air Systems Command, Washington, DC 20361, Attention: AIR-5304C.
- c. One copy to the San Antonio Air Logistics Center, Kelly Air Force Base, TX 78241.

**6.4 Metric conversions.** Metric system conversions shown herein are exact equivalent values for those properties critical to the design of the product. All other conversions are approximate.

**6.5 Changes from previous issue** Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

**Custodians:**  
Army - ME  
Navy - AS

Preparing activity  
Navy - AS

(Project 8305-0956)

**Review activities:**  
Army - AV, MI, AR

**User activities:**  
Army - GL  
Navy - MC

## MIL-C-5651D

TABLE I. Number of ends in braid.

Size, OD of finished cord, inch (centimeter)	Number of ends	
	Inner braid	Outer braid
TYPE I:		
.250 (.635)	16	24
.375 (.953)	24	48
.500 (1.27)	32	72
.625 (1.59)	48	72
.750 (1.91)	60	96
TYPE II:		
.250 (.635)	32	32
.375 (.953)	48	48
.437 (1.11)	48	48
.500 (1.27)	48	48
.562 (1.43)	48	48
.625 (1.59)	48	48
.687 (1.75)	48	48
.750 (1.91)	64	64
.812 (2.06)	64	64
TYPE III:		
.125 (.32)	-	32
.187 (.476)	-	32
.312 (.794)	-	32

TABLE II. Cord lengths, spools, and reels. 1/

Cord size, diameter, inch (cm)	Length, feet (m) ( <u>±</u> 5%) <u>2/</u>
.250(.635), .375(.953), .500 (1.27)	500 (150)
.187(.474), .312(.792), .625 (1.588)	250 ( 75)
.750 (1.905)	200 ( 60)

1/ Cord acquired in lengths not exceeding 50 feet (15 m) shall be furnished as coils.

2/ Short lengths may be furnished; however, no individual length shall be less than 50 feet (15 m).

## MIL-C-5651D

TABLE III. Physical Properties.

Characteristic	Requirements									
	I					III				
Type	.250( 635)	.375( 953)	500(1 27)	.625(1.59)	.750(1 91)	.125(.32)	187( 476)	.312(.794)		
Diameter/inches (centimeters)	2.4 1.1	5.5 2.5	9.0 4.0	14 6.3	22 9.8	1.85 .84	1.3 .58	3.1 1.4		
Weight:										
Tensile properties, load:										
Ø 50% elongation	Ø 12	30-60	80-120	100-180	200-350	1-2.5	2-6	5-10		
lbs.	3.6-8.5	13.6-27.2	36.3-64.5	45-82	91-159	.45-1.2	.91-2.7	2.3-4.5		
kg.										
Ø 75% elongation:	10-18	50-100	110-190	160-250	300-450	1.9-3.4	4-8	6-12		
lbs.	4.5-8.2	23-45	50-86	73-113	136-204	.86-1.5	1.8-3.6	2.7-5.4		
kg.										
Ø 100% elongation:	16-28	90-150	175-250	250-350	400-650	2.4-4.5	6-10	8-15		
lbs.	1.3-12.7	41-68	79-113	113-159	182-295	1.1-2.0	2.7-4.5	3.6-6.8		
kg.										
Ø 125% elongation:	-	-	-	-	-	2.9-5.4	8-12	10-18		
lbs.						1.3-2.4	3.6-5.4	4.5-8.2		
kg.										
Breaking strength min.										
lbs	120	300	400	500	1000	30	45	75		
kg	54.5	136	193	227	454	13.6	20.5	34		
Ultimate elongation % min	140	140	140	140	120	200	200	200		
Drift, %, max	20	20	20	20	20	10	10	10		
Set, % max	10	10	10	10	10	5	5	5		
Low temp set, %, max	10	10	10	10	10	5	5	5		
Flex, cycles, min	5 x 10 <sup>4</sup>	5 x 10 <sup>4</sup>	5 x 10 <sup>4</sup>	5 x 10 <sup>4</sup>	1 x 10 <sup>4</sup>	3.5 x 10 <sup>3</sup>	3.5 x 10 <sup>3</sup>	3.5 x 10 <sup>4</sup>		
Low temp exposure load, % change from initial max.	+50	+50	+50	+50	+50	+12	+12	+12		



## MIL-C-5651D

TABLE III Physical Properties. - Continued

Characteristic	Requirements									
	I					III				
Type	250( 635)	375( 953)	500(1 27)	625(1 59)	750(1 91)	125( 32)	187( 476)	312( 794)		
Diameter/inches (centimeters)										
After heat aging, % change from initial value. Load @ 100% elongation	-35 to +20	-40 to +20	-40 to +20	-45 to +20	-50 to +20	-30 to +20	-30 to +20	-30 to +20		
Breaking strength, max.	-40	-40	-40	-40	-40	-20	-20	-20		
Ultimate elongation, max	-30	-20	-20	-20	-20	-20	-20	-20		
Flex. cycles, min	5 x 10 <sup>2</sup>	5 x 10 <sup>3</sup>	5 x 10 <sup>3</sup>	5 x 10 <sup>3</sup>	2 x 10 <sup>3</sup>	9 x 10 <sup>3</sup>	9 x 10 <sup>3</sup>	10 x 10 <sup>3</sup>		
Type	II									
Diameter/inches (centimeters)	250( 635)	375( 953)	438(1 11)	500(1.27)	.562(1.43)	625(1.59)	687(1.75)	.750(1.91)	812(2.06)	
Load @ 100% elongation lbf kg	32-56 14.5-25.4	180-300 82-136	260-400 118-182	350-500 159-227	425-600 193-272	500-700 227-318	650-850 295-386	800-1300 363-590	1100-1500 499-681	

## MIL-C-5651D

TABLE IV. Dimension sample size and acceptance number.

Lot size, feet (meters (m)) <u>1/</u>	Sample size cores, coils, or spools <u>2/</u>	Maximum number of defects acceptable in sample
Up to 1,300 (up to 400)	3	0
1,301 to 3,200 (401 to 980)	5	0
3,201 to 8,000 (981 to 2,440)	7	0
8,001 to 22,000 (2,441 to 6,700)	10	0
22,001 to 110,000 (6,701 to 33,500)	15	1
110,001 and over (35,501 and over)	25	1

1/ Metric conversions are not exact.

2/ When a lot contains fewer than 3 rolls, coils, or spools, the entire lot shall be the sample.

TABLE V. Visual examination

Examination	Defect	Major	Minor
Marker threads	Not correct color code or showing more than 6 months of age	X <u>1/</u>	
Cord strands	Not stranded Strands adhere to each other	X	X
Cover	Abrasion marks resulting in a weak spot	X	
	Broken or missing yarn	X	
	Two or more contiguous regardless of length		
	Knot, clearly visible <u>2/</u>		X
	Spot or stain, clearly visible <u>2/</u>		X
	Does not adhere tightly to the cord	X	
	Float multiple	X	

1/ Any spool or coil indicated overage by marker end examination shall be removed and replaced with another sample. When corrected, this examination shall not be scored as a defect.

2/ Observed at normal inspection distance (approximately 3 feet (1 m)).

## MIL-C-5651D

TABLE VI. Quality conformance physical property inspection.

Property	Requirement	Test paragraph	Number of determinations per unit of product <u>1/</u>
Weight per 100 feet (30 m), max.	Table III	4.6.1.3	1
Load in lbs: <u>2/</u>			
50% elongation	Table III	4.6.2	3 <u>3/</u>
75% elongation	Table III	4.6.2	3
100% elongation	Table III	4.6.2	3
125% elongation	Table III	4.6.2	3
Breaking strength, lbs., min.	Table III	4.6.2	3
Ultimate elongation %, min.	Table III	4.6.2	3

- 1/ Reporting of test results shall be as specified in the applicable test paragraph and 4.5.3.
- 2/ Load in pounds (lbs.) shall be determined dependent on type applicability (see Table III).
- 3/ The specimens for 50% elongation shall be used to determine the remaining properties specified in 4.6.2.

TABLE VII. Packaging examination.

Examination	Defect
Packaging	Not level required by contract or order Material or construction not as specified
Packing	Not level required by contract or order Any nonconforming component Closure not as specified Material or construction not as specified
Count	Less than specified in contract or order
Marking	Packaging and packing-omitted, illegible, incorrect, incomplete or not in accordance with contract

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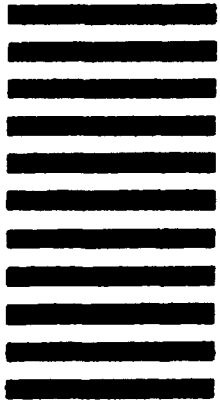
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## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

*(See Instructions - Reverse Side)*

1. DOCUMENT NUMBER MTI-C-5651D		2. DOCUMENT TITLE Cord, Elastic, Exerciser and Shock Absorber for Aeronautical Use	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one)	
b. ADDRESS (Street, City, State, ZIP Code)		<input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER (Specify) _____	
5. PROBLEM AREAS			
a. Paragraph Number and Wording:			
b. Recommended Wording			
c. Reason/Rationale for Recommendation			
6. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		b. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional		8. DATE OF SUBMISSION (YYMMDD)	