

INCH-POUND

A-A-59963

26 February 2016

SUPERSEDING

MIL-DTL-32072

8 January 2002

## COMMERCIAL ITEM DESCRIPTION

### THREAD, POLYESTER

The General Services Administration has authorized the use of this Commercial Item Description as a replacement for MIL-DTL-32072, dated 8 January 2002 for all federal agencies.

1. **SCOPE.** This Commercial Item Description covers the requirements for polyester thread used for machine sewing.

2. **CLASSIFICATION.** The following Types, Classes and Subclasses of threads are as specified.

2.1 Types.

- Type I - Twisted, soft, multiple cord
- Type II - Twisted, bonded, multiple cord
- Type III - Bonded, monocord
- Type IV - Soft, air entangled
- Type V - Bonded, air entangled

2.2 Classes.

- Class 1 - Normal elongation.
- Class 2 - Deleted
- Class 3- Heat stable – low shrinkage

2.3 Subclasses.

- Subclass A - General purpose
- Subclass B - Non-wicking finish
- Subclass C - No finish

Comments, suggestions, or questions on this document should be addressed to: DLA Troop Support Standardization Team, 700 Robbins Avenue, Philadelphia, PA 19111-5096. Since contact information can change, you may want to verify the currency of the address information using Acquisition Streamlining and Standardization Information System (ASSIST) online database <http://quicksearch.dla.mil>.

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2.3.1 Subclasses references. In end item documents where no Subclass designation “A”, “B”, or “C” is indicated, the requirements for Subclass “A” shall apply.

### 3. SALIENT CHARACTERISTICS.

3.1 Description. All threads shall be bright, continuous multifilament polyester yarn with a density of 1.36 to 1.40 grams/cubic centimeter (g/cc). The bonding agent used in Types II, III, and V shall be colorless. Unless otherwise specified, the direction of the final twist shall be “Z” for Types III, IV and V. For Types I and II thread (used for sole stitching of footwear) shall be “S” or “Z” depending upon the initial twist. The final twist for Type I and II shall be the opposite of the initial twist.

3.2 Physical requirements. The finished thread shall conform to the applicable physical characteristics as specified in Tables I, II, and III for Types and Classes, when tested as specified in Table IV.

TABLE I. Physical characteristics - Types I, II, and III, Class 1.

Tex (sizes)	Government Letter Size or Number Size	Breaking strength, lbs. (min.)			Number of Ply		Elongation % (max.) Type I, II, and III
		Type I	Type II	Type III	Type I & Type II	Type III	
16	00	1.4	1.5	1.4	2	1	28
21-24	A	2.0	2.3	2.6	2 or 3	1	28
30-35	AA	3.0	3.0	3.0	2,3 or 4	1	28
45-50	B	4.3	4.5	5.3	2 or 3	1	28
70	E	8.0	8.0	8.0	3	1	28
90	F	10.6	10.6	10.6	3 or 4	1	28
135-150	FF	16.0	16.0	16.0	3 or 5	1	28
210	3	24.0	24.0	24.0	3	1	28
270-300	4	32.0	34.0	32.0	3	1	28
350	5	40.0	42.0	40.0	3	1	28
400-450	6	48.0	48.0	48.0	3	1	28
500	7	54.0	54.0	54.0	3	1	28
600	8	60.0	60.0	60.0	3 or 5	1	28
700	10	70.0	70.0	70.0	3, 5 or 6	1	28

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TABLE II. Physical characteristics - Type I, Class 3.

Tex (sizes)	Government Letter size or Number size	Number of Plies	Breaking Strength, lbs.(min.)	Elongation %, (max.)
16	00	2	1.2	35
24	A	2 or 3	1.9	35
50	B	2 or 3	3.8	35
70	E	3	6.8	35
90	F	4	7.6	35
135-150	FF	3	16.0	35
210	3	3	19.0	35
300	4	3	27.2	35
350	5	3	34.0	35
450	6	3	41.0	35
500	7	3	47.7	35

TABLE III. Physical characteristics - Types IV and V, Class 1.

Tex (sizes)	Breaking strength, lbs. (min.)	Number of Plies	Elongation %, (max.)
	Type IV and Type V	Type IV and V	Types IV and V
16	1.0	1	26
21	1.4	1	26
24	1.6	1	26
27	1.8	1	26
30	2.0	1	26
40	2.8	1	26
50	3.6	1	26
60	4.3	1	26
80	5.4	1	26
90	5.9	1	26
105	6.9	1	26

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TABLE IV. Physical requirements – All Types and Classes.

Characteristic	Requirements	Test method
Fiber identification	3.1	ASTM D276 or AATCC 20 <u>1/</u>
Visual shade matching	3.3	3.4
Density	3.1	AATCC 20
Bright continuous multifilament	3.1	Visual
Tex (size)	Tables I, II and III	ASTM D204 <u>2/</u>
Ply	Tables I, II and III	Visual
Colorfastness (all Types and Classes):		
Laundering (after 3 cycles)	3-4 (min.)	AATCC 61 3A <u>3/</u> , <u>4/</u> , <u>5/</u>
Perspiration (acid/alkaline)	3-4 (min.)	AATCC 15 <u>3/</u> ,
Light (after 40 hrs or 170 kJ/(m <sup>2</sup> nm)@420 nm)	3-4 (min.)	AATCC 16.2 or 16.3 <u>3/</u>
Dry heat at 356 (±) 3°F	3-4 (min.)	AATCC 117 <u>3/</u> , <u>4/</u>
Weathering, Type I and III only, (after 340 kJ/ (m <sup>2</sup> nm) @420 nm)	3-4 (min.)	AATCC 169 Opt 1 <u>3/</u>
Final twist	3.1	ASTM D1423
Breaking strength	Tables I, II, and III	ASTM D204 <u>6/</u>
Elongation	Tables I, II, and III	ASTM D204
Heat shrinkage (Class 3 only), %, (max.)	3.2.2	ASTM D204 <u>7/</u>
Resistance to wicking (Subclass B only)	3.5.2	3.5.2.1

1/ In case of dispute, the ASTM method prevails.

2/ Tex (sizes) for all threads based on weight in grams/1,000 meters thread, per ASTM D204.

3/ AATCC Evaluation Procedure 1, Gray Scale for Color Change.

4/ The color transfer cloth evaluation shall not apply.

5/ The specimen shall be dried after each laundering cycle.

6/ Except that five (5) determinations shall be made per sample unit.

7/ Five (5) specimens prepared as specified in ASTM 204 shall be tested in accordance with the dry heat method and exposed for 1-hour using the weights specified in Table IV. The shrinkage shall be determined as a percent change from original measured length and the average test result of the five (5) specimens reported to the nearest 0.1 percent.

3.2.1 Knots. Thread Tex (size) 150 and finer shall average not more than one (1) thread knot per 2-ounces, and thread Tex (size) 210 and heavier shall average not more than one (1) thread knot per 4-ounces.

3.2.2 Heat stability shrinkage (Class 3 only). The Class 3 thread shall have a maximum shrinkage of 3.0 percent, when tested in accordance with Table IV and the weights in Table V.

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TABLE V. Heat Stability shrinkage test weights- Type I, Class 3 only.

Tex size	Weight, ounces (oz.)
16, 24, 50	1
70, 90,135-150	2
210	4
300, 350,450,500	8

3.3 Color. The color shall be as specified in the applicable end item specification or in the contract (see 7.5).

3.4 Visual shade matching. The color and appearance of the finished thread shall match the standard sample when viewed using AATCC Evaluation Procedure 9, Option A, with sources simulating artificial daylight D75 illuminant with a color temperature of 7500 ( $\pm$  200)K illumination of 100 ( $\pm$  20) foot candles, and shall be a good match to the standard sample under incandescent lamplight at 2856 ( $\pm$  200)K

3.5 Finishing materials. The finished thread shall have no chemical finishes or treatments other than those commonly used (e.g. water-repellent, etc.) on commercial threads or as specified in the contract which have been demonstrated to have no harmful effects on the fiber, including effects of prolonged storage. No finish or treatment shall be applied for the purpose of increasing breaking strength. There shall be no noticeable wicking of the treatment on the thread to adjacent material when sewn.

3.5.1 Bonding agent. Bonding agents shall be applied to Types II, III, and V and when necessary to provide good sewing quality.

3.5.2 Non-wicking finish (Subclass B). Subclass B thread shall have a uniformly applied commercial nontoxic non-wicking finish. The use of compounds containing mercury in any form shall not be used. The finished thread shall resist the wicking of water when tested as specified in 3.5.2.1.

3.5.2.1 Vertical resistance to wicking. The thread shall be water repellent treated so that the treated thread shall resist the wicking of water for a period of not less than 2-hours when tested as follows: The test specimen shall consist of a 20 strand skein of thread in one continuous 30 yard length made on a 54-inch periphery skein reel. The skein shall be reeled under enough tension to cause the strands in the skein to lie uniformly, side by side, on the reel. The finishing end of the skein shall be tied to the starting end of the skein in such a manner that the knot will not add additional length to the reel skein. The skein shall be hung over the movable crossbar of a laboratory stand with the end hanging over the vessel. The movable crossbar shall rise 28-inches or more above the base. A non-ferrous 3/4 to 7/8 ounce weight shall be placed in the lower catenary of the skein to keep it taut and straight. The skein shall be arranged so that the strands are touching each other in flat ribbon form. The vessel shall be filled to a depth of at least 5-inches with distilled water at a room temperature which has been mixed with 0.05 percent blue food coloring (salt and wetting agent free). A piece of blotting paper shall be attached by means

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of a paper clip or similar clamp to one full side (20 strands) of the skein, 3-inches above the lower catenary of the skein. The position of the crossbar shall be adjusted that when the skein is hung freely in the liquid, 2-inches of the skein will be immersed in the liquid and the lower edge of the blotter is 1-inch above the liquid surface. The skein shall then be slowly lowered into the dyebath and the time of entry shall be noted. Depending on the dimensions of the vessel and the length of the crossbar, several specimens can be tested at the same time in the same dyebath by hanging the skeins sufficiently apart on the crossbar. The skein shall be exposed for 2-hours. The blotter shall be examined for wetting or staining at least every hour. The test shall be terminated whenever staining or wetting of the blotter is observed within the 2-hour duration. Staining or wetting before the 2-hour time frame shall constitute a failure.

3.6 Toxicity. The finished thread shall not present a health hazard and shall show compatibility with prolonged, direct skin contact when tested as specified in 5.3. Chemicals recognized by the Environmental Protection Agency (EPA) as human carcinogens shall not be used.

3.7 Put-up. Unless otherwise specified, the thread shall be put-up on holders such as commercial spools, cones, or tubes as specified in the contract. The thread shall be wound around the specified holder in one continuous piece, so that each turn and layer is free of entanglement. The outside ending of the thread shall be secured to prevent unwinding, loosening, or slippage during handling, shipping, or storage.

3.7.1 Looper and bobbin color identification. Spools, cones, tubes used for needle, looper and bobbin thread shall be color identified in some manner to provide consistency to recognize sizing when end item is sewn with different thread suppliers. Bobbins may be colored with markers, other permanent means or stated color on storage box. Thread sizes need to be easily recognized and are identified by color in Table VI.

TABLE VI. Looper and bobbin color identification.

Letter size <u>1/</u> , <u>3/</u>	Color	Number size <u>2/</u> , <u>3/</u>	Color
00	White	3	Grey
A	Pink	4	Dark Blue
AA	Black	5	Orange
B	Light Gray	6	Brown
E	Yellow	8	Lime Green
F	Light Blue	--	--
FF	Dark Green	--	--

1/ These colors will be used for all Tex (sizes) that apply to this Government Letter size.

2/ These colors will be used for all Tex (sizes) that apply to this Government Number size.

3/ Non-wicking threads in any size shall be so designated on label along with Green ring permanently affixed to top of spool. Pre-made bobbins may be colored with markers, other permanent means or stated color on storage box.

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3.8 Labeling. Each thread holder shall have a label, adhered securely so as to remain in place and be clearly legible until all thread has been removed. The label shall be printed and include information related to length in yards or weight of cone, direction of twist, color, Tex size, name of thread manufacturer, and nomenclature specifying fiber type and construction.

3.9 Workmanship. The finished thread shall conform to the quality of product established by this document. The thread shall average not more than one full thread knot or splice per 1,000 yards. The occurrence of defects shall not exceed the contractor's own quality assurance standards and the quality assurance standards defined by the technical data in the bid package.

4. REGULATORY REQUIREMENTS. Unless otherwise specified the offer/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR).

#### 5. PRODUCT CONFORMANCE PROVISIONS.

5.1 Product conformance. The products provided shall meet the salient characteristics of this Commercial Item Description, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial marketplace. The Government reserves the right to require proof of such conformance.

5.2 Visual examination. Thread shall be examined for the defects listed in Table VII below.

TABLE VII. Visual examination defects.

<p><u>Knots:</u> Size 150 and finer thread not more than one (1) thread knot per 2-ounces. Size 3 and heavier not more one (1) thread knot per 4 ounces of thread.</p>
<p><u>Color:</u> Not as specified.</p>
<p><u>Workmanship:</u> More than one (1) full thread knot or splice per 1,000 yards; defects exceed the quality assurance standards (both contractor's and government standards).</p>
<p><u>Labels:</u> Label missing, incorrect, or illegible. Required information missing from the label.</p>
<p><u>Packaging:</u> Not packaged in accordance with the contract or purchase order</p>

5.3 Toxicity test. When required (see 7.5), an acute dermal irritation study and a skin sensitization study shall be conducted on laboratory animals. When the results of the studies indicate the thread is not a sensitizer or irritant, a Repeat Insult Patch Test shall be performed in accordance with the Modified Draize Procedure (see 7.2.3). If the toxicity requirement (see 3.6) can be demonstrated with historical use data, toxicity testing may not be required (see 7.5).

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5.4. Acceptance criteria. Acceptance criteria shall be as specified in the contract or purchase order (see 7.5).

## 6. PACKAGING

6.1 Packaging. Preservation, packing, and marking shall be as specified in the contract or order (see 7.5).

## 7. NOTES

### 7.1 Sources of Government documents.

7.1.1 Copies of Government documents are available online at <http://quicksearch.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.

### 7.2 Sources for Non-Government Documents.

7.2.1 AATCC test methods are available online at <http://www.aatcc.org> or from the American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709-2215.

7.2.2 ASTM Standards are available online at <http://www.astm.org> or from ASTM INTERNATIONAL, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

7.2.3 Modified Draize Procedure: Principles and Methods of Toxicology (fourth edition), A Wallace Hayes (editor), pp 1057 – 1060, 2001 are available online from <http://www.taylorandfrancis.com/> or from Taylor and Francis, 270 Madison Avenue, New York, NY 10016.

7.3 Intended use. The threads are intended for machine sewing of clothing, tentage, equipage, and footwear. The Type I, Class 3 (Subclass A) thread is specifically intended for use in parachutes that are subject to exposure at elevated temperatures. Subclass B threads are intended for tentage, equipage, and other items where water resistance of seams is required, and used primarily in Type I and III threads. Type I and II threads are used for stitching of footwear. Subclass C thread covers the larger sizes of thread used in footwear and other leather items which are waxed at the sewing machine and require that no sewing or other type finish be applied.

7.4 Standard samples. For access to standard shade samples of thread, address the contracting activity issuing the invitation for bids or request for proposal.



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7.5 Ordering data. The contract or order should specify the following:

- a. Title, number, and date of this Commercial Item Description (CID)
- b. Type, Class, and Subclass required (see 2.0)
- c. Color required (see 3.3)
- d. When toxicity testing is required (see 3.6)
- e. Put-up required if other than specified (see 3.7)
- f. Product conformance provisions (see 5.1)
- g. Acceptance criteria provisions (see 5.4)
- h. Packaging requirement (see 6.1)

7.6 Key words.

Cover, helmet  
Equipage  
Flag, Parachute  
Footwear  
Parka  
Shoes  
Streamers  
Tentage  
Trousers

MILITARY INTERESTS:

Custodian:

Army-GL  
Navy- NU  
Air Force- 11

Review Activities:

Army- MD

CIVIL AGENCY COORDINATING ACTIVITY:

GSA-FSS

PREPARING ACTIVITY:

DLA –CT  
Agent – Army-GL

Project Number: 8310-2016-001

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