

[INCH-POUND]
A-A-55126A
June 23, 1999
SUPERSEDING
A-A-55126
February 5, 1993
MIL-F-21840G
December 16, 1987

COMMERCIAL ITEM DESCRIPTION

FASTENER TAPES, HOOK AND LOOP, SYNTHETIC

The General Services Administration has authorized the use of this commercial item description for all Federal agencies. This document supersedes A-A-55126 dated February 5, 1993 and MIL-F-21840 dated 16 December 1987.

1. **SCOPE.** This commercial item description covers the requirements for different types, classes, colors, and widths of hook and loop synthetic fastener tapes. The woven fastener tapes are intended to be used as closures for equipment and clothing. Based on this information, users should determine which type and class of hook and loop fastener tape meets their requirements (see 7.3).

2. **CLASSIFICATION.** The hook fastener tape shall be in the following types and classes. The pile fastener tape shall be of one type and in the following classes.

2.1 Types :

- | | | |
|---------|---|----------------------------|
| Type I | - | 6.5 mil hook fastener tape |
| Type II | - | 8.0 mil hook fastener tape |

2.2. Classes :

Hook fastener tape:

- | | | |
|---------|---|----------------------------|
| Class 1 | - | All nylon |
| Class 2 | - | Nylon and aramid (see 7.5) |
| Class 3 | - | All polyester |

Loop fastener tape:

- | | | |
|---------|---|----------------------------------|
| Class 1 | - | All nylon |
| Class 2 | - | All non-melting aramid (see 7.5) |
| Class 3 | - | All polyester |

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any pertinent data which may be of use in improving this document should be addressed to: Defense Supply Center Philadelphia, Clothing and Textiles Directorate, Attn.: DSCP-COCT, 700 Robbins Avenue, Philadelphia, PA 19111-5096.

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3. SALIENT CHARACTERISTICS

3.1 Tape material. The hook and loop fastener tapes shall be fabricated of synthetic fibers and yarns (see 7.1). The Type I hook fastener tape shall be made using a 6.5 mil, 200 denier hook, and the Type II fastener tape shall be made using a 8.0 mil, 300 denier hook. The class 1 hook fastener tape shall be a nylon hook with nylon ground. The class 2 hook fastener tape shall be a nylon hook with a non-melting aramid ground. The class 1 loop fastener tape shall be all nylon and the class 2 loop fastener tape shall be all non-melting aramid. When non-melting aramid yarns are specified, the yarns shall have a minimum carbonizing temperature of 657 degrees F. The Class 3 hook and loop fastener tapes shall be all polyester.

3.2 Construction.

3.2.1 Construction of hook fastener tape. The hook fastener tape shall be of woven, warp loop, narrow fabric construction, with multifilament ground ends (including selvages) and picks. Monofilament auxiliary warp ends shall be woven in the form of raised loops which can be heat set to retain their shape and cut near the top of the loop in order to form a free hook engaging section. The hook shall be leno woven in a staggered order. The hook fastener tape shall be visually examined for construction conformance and it shall conform to the requirements in Table I when tested in accordance with the test methods in Table II. One determination per sample unit shall be made and the results reported as “pass” or “fail”. Recommended use of hook tape shall be indicated in 7.3.

3.2.2 Construction of loop fastener tape. The loop fastener tape shall be of woven, warp loop, narrow fabric construction, with multifilament ground ends (including selvages) and picks, with leno woven loop warp ends. The piles shall be suitably napped to form a uniformly disoriented surface of uncut loops capable of being engaged by the hooks of the hook fastener tape component. As an alternate, the loop shall be woven of specially treated loop yarns that provide a uniformly disoriented surface without being napped. The loops of class 2 tape shall remain unnapped. The loop fastener tape shall be visually examined for construction conformance and it shall conform to the requirements in 3.2, Table I when tested in accordance with the test methods cited in Table II. One determination per sample unit shall be made and the results reported as “pass” or “fail”. Recommended use of loop tape shall be as indicated in 7.3.

3.3 Physical requirements. The hook and loop fastener tape shall conform to the requirements stated in Table I. The tolerance for each width shall be $\pm 1/16$ inch including selvage. Each selvage shall not exceed $3/32$ inch.

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TABLE I. Physical requirements, width - inches

Property/Characteristic	width – inches					
	4	2	1-1/2	1	3/4	5/8
Weight: (grams/linear yard, min.)						
Type I Hook						
Class 1	14.4	9.0	6.9	4.5	3.4	2.8
Class 2	----	13.2	9.7	6.6	4.8	4.4
Type II Hook						
Class 1	15.2	9.4	6.9	4.7	3.5	2.8
Class 3	-----	10.6	----	5.6	----	----
Loop						
Class 1	22.4	12.6	9.4	5.9	4.1	3.4
Class 2	-----	15.8	12.0	8.1	6.0	5.0
Class 3	-----	10.4	-----	5.3	----	----
Breaking strength: (lbs., min.)						
Type I Hook						
Class 1	320	170	115	90	70	65
Class 2	-----	230	155	125	90	85
Type II Hook						
Class 1	320	170	135	100	80	65
Class 2	-----	230	-----	130	---	----
Class 3	----	230	----	130	---	---
Loop						
Class 1	280	165	120	75	50	43
Class 2	-----	230	160	115	70	50
Class 3	-----	175	-----	95	----	----

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TABLE I. Physical requirements, width - inches - continued

Property/Characteristic	4	2	1-1/2	1	3/4	5/8
Shear strength: 1/ 2/ 3/ 4/						
Type I Hook						
Class 1	5.0	5.0	5.0	5.0	4.7	4.3
Class 2	----	10.0	10.0	10.0	6.7	5.0
Type II Hook						
Class 1	10.0	10.0	10.0	10.0	6.7	4.7
Class 3	-----	16.0	-----	16.0	----	----
Peel strength: 1/ 2/ 4/						
Type I Hook						
Class 1	.5	.5	.5	.5	.5	.5
Class 2	---	.5	.5	.5	.5	.5
Type II Hook						
Class 1	1.0	1.0	1.0	1.0	1.0	1.0
Class 3	----	.5	----	.5	----	----

1/ After 3 launderings.

2/ After 1 dry cleaning.

3/ For a 2 inch linear overlap.

4/ Tapes over 1 inch are slit to 1 inch prior to testing. Tapes of 1 inch or under are tested as is.

Values reflect pounds/inch width for peel only. Shear values apply to a 2-inch overlap only.

TABLE II. Test methods

Characteristic	Requirement reference	Test method
Hook & loop tapes:		
Weight	Table I	ASTM-D-3776, Opt.D 1/
Breaking strength	Table I	ASTM-D-5034 2/
Shear strength 3/		
After 3 launderings	Table I	AATCC 61, Test 3A
After 1 dry cleaning 4/	Table I	AATCC 132,
Peel strength		
After 3 launderings	Table I	AATCC 61, Test 3A,
After 1 dry cleaning 4/	Table I	AATCC 132,
Stitch tear strength	Table III	ASTM-D-2261, Option 1

1/ Test specimen shall be full width and 3 feet in length.

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2/ The contractor may exercise the option to use either the jaws specified, or an approved commercial cam type clamp. When splices are tested for breaking strength, the splice shall be centered between the jaws.

3/ Samples containing splices shall not be used for the shear or peel test.

4/ Procurement documents should specify as needed.

3.3 Colors. The hook and pile fastener tape shall be in the colors specified in the contract or purchase order (see 7.6).

3.3.1 Color matching. The color of the fastener tape shall match the standard sample when viewed under filtered tungsten lamps that approximate artificial daylight and that have a correlated color temperature of $7500 \pm 200\text{K}$, with illumination of 100 ± 20 foot candles, and shall be a good match to the standard sample under incandescent lamplight at $2300 \pm 200\text{K}$.

3.3.2. Colorfastness. The fastener tapes shall show colorfastness to laundering, dry cleaning (if required by contract), and dry and wet crocking when tested in accordance AATCC 61-Test 2A, AATCC 132 (AATCC Gray Scale), and AATCC 8 (use AATCC Chromatic Transference Scale), respectively. When no standard sample is available or referenced for colorfastness, the dyed tape fasteners shall show good fastness at Step 4 or higher for laundering, 3.5 or higher for dry cleaning and colorfastness to crocking when tested as specified, otherwise it shall be equal to the standard sample.

3.4 Thickness. All hook fastener tapes shall have a minimum thickness of 0.050 inch and all pile fastener tapes shall have a minimum thickness of 0.095 inch when tested in accordance with ASTM-D-1777 (test option 1).

3.5 Shrinkage. All hook fastener tapes shall not exceed 3.0 percent shrinkage in the length direction and all loop fastener tapes shall not exceed 4.0 percent shrinkage in the length direction when tested in accordance with AATCC 135, Method (3), V, Aiii. Only the Shrinkage in the length direction shall be determined.

3.6 Finish. All hook and loop fastener tapes shall be stabilized as necessary to allow for maximum flatness and dimensional stability. In addition, the back of each Class 1 and 3 hook fastener tapes shall be coated with a suitable polymeric or elastomeric undercoating. The Class 2 hook and Class 2 loop fastener tape shall be coated with a flame retardant coating. The coatings shall be properly cured as necessary.

3.7 Special adhesive backings. When a special adhesive backing is specified, the fastener tapes shall be coated with an adhesive backing (except for selvages) to provide an easy and reliable method of attachment (see 7.4).

3.8 Splicing. When spliced tape is furnished, care shall be taken to assure that splices are properly aligned with edges smooth to allow free passage through automatic sewing equipment. The spliced area shall not affect the functional characteristics of the hook and loop tapes. The sealed splices shall have no loose edges. The breaking strength of the splice shall be not less than

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30 percent of the minimum specified for the unspliced tape when tested in accordance with ASTM-D-5034 (Option G-T or G-E) except that the jaws shall be 1 inch by 3 inches or an approved commercial cam type clamp. The length of the overlap of the splices shall be 5/16 to 5/8 inch. When splices are tested for breaking strength, the splice shall be centered between the jaws. When spliced tape is furnished as a component in an end item, the limits of its applications shall be outlined in the end item document.

3.9 Fray resistance. Five specimens each of the hook and loop fastener tapes shall be tested in accordance with AATCC 135 Method (3), V, Aiii for fray resistance after 3 launderings, and in accordance with AATCC 132 for fray resistance after one dry cleaning or commercial dry cleaning using perchloroethylene (if required by contract). Specimens shall be 10 inches long and full width and shall be prepared for testing by slitting lengthwise up the middle for a distance of 8 inches. After laundering or dry cleaning, or when tapes with slit selvages are furnished, the slit edges shall also be examined for fraying. The hook and loop fastener tapes shall show no more than 1/32 inch fraying after laundering or dry cleaning (when applicable). In addition, ultrasonically slit fastener tapes shall be tested for fraying.

3.10 Length and put-up. The hook and loop fastener tapes shall be put up on flanged spools. The height of the flanges shall be sufficient to accommodate the height of the wound tape. An overlap of not more than 1/4 inch of the wound tape beyond the flange edge is permitted. The minimum length of any given piece shall be not less than three feet. There shall be no more than one, three-foot length in any spool. For every 25 yards length on a spool, there shall be no more than three splices or four pieces. The end of the spool shall be secured with a strip of its opposite component which shall be marked to indicate the number of pieces contained on the spool.

3.11 Stitch tear strength. Five preconditioned 8-inch long hook and loop fastener tapes shall be tested. Holding the sample lengthwise, starting 3 inches in, make a center stitch line (12 stitches per inch using a 0.044 inch medium ball needle without thread) down the length of the sample. The sample will then be cut from the start edge to the first hole, making a 3 inch tab for the testing. The tapes shall meet the requirements listed in Table III.

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TABLE III. Stitch tear strength requirements

Property/ Characteristic	4	2	1-1/2	1	3/4	5/8
Stitch Tear Strength(min. lb.)						
Type I Hook						
Class 1	3.5	3.5	3.5	3.5	3.5	3.5
Class 2	7.0	7.0	7.0	7.0	7.0	7.0
Type II Hook						
Class 1	3.5	3.5	3.5	3.5	3.5	3.5
Class 2	2.0	2.0	2.0	2.0	2.0	2.0
Loop						
Class 1	6.0	6.0	6.0	6.0	6.0	6.0
Class 2	7.0	7.0	7.0	7.0	7.0	7.0
Class 3	3.5	3.5	3.5	3.5	3.5	3.5

4. REGULATORY REQUIREMENTS. The offeror/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. QUALITY ASSURANCE PROVISIONS

5.1 Product conformance. The products provided shall meet the salient characteristics of this CID, conform to the producer's own drawings, specifications, standard, and quality assurance practices. The Government reserves the right to require proof of such conformance.

5.2 Visual examination. The hook and loop fastener tapes shall be examined as noted in 5.2.1.

5.2.1 Defects. Any hole, cut, or tear; color not as specified; any part shaded; any spot or stain (topside); raw edges; width of tape or selvages not as specified; any missing or broken yarn; hooks or loop flattened; splices not sealed; slit edges not as specified; not packaged in accordance with contract or purchase order.

5.3 Acceptance criteria. Acceptance criteria shall be as specified in the contract or purchase order.

6. PACKAGING

6.1 Preservation, packing, and marking. The preservation, packing, and marking shall be as specified in the contract or purchase order.

7. NOTES

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7.1 Source of Government documents. Copies of military and Federal documents are available from:

Defense Automated Printing Service
Bldg. 4D (DPM-DODSSP)
700 Robbins Avenue
Philadelphia, PA 19111-5094

7.2 Source of non-Government documents.

ASTM Test Methods

(Applications for copies should be addressed to American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

AATCC Test Methods

(Applications for copies should be addressed to American Association of Textile Chemists and Colorists (AATCC), P. O. Box 12215, Research Triangle Park, NC 27709-2215.)

7.3 Uses for hook and loop fastener tapes. Type II hook fastener tapes generally have slightly higher shear strength than Type I hook fastener tape when tested with Class 1 loop fastener tapes. Class 1 hook and class 1 loop fastener tapes are intended for general purpose applications. Class 2 hook and class 2 loop fastener tapes are intended for those applications where flame retardancy is desired. Class 3 hook and class 3 loop fastener tapes are intended for applications where resistance to wetting, high humidity or to UV radiation is required.

7.3.1 Compatibility. The user should determine whether or not the hook fastener tape of one manufacturer should be mated with the loop fastener tape of another manufacturer.

7.3.2 Special center selvage tape for applications that require extra sewing down the center of the tape. To prevent center stitching problems on the 2-inch tape, the user needs to specify “center selvage tape”. This tape is manufactured with a 1/8 inch to 3/16 inch selvage on each edge and down the center of the tape. This selvage is free of hook and loop.

7.4 Special adhesive backing. Special adhesive backings are available which are designed to secure tapes to many diverse materials such as wood, glass, metal, textiles, etc. In addition, adhesive backings are available which vary in the mode of application to these materials (i.e., they may be water activated, heat activated, solvent activated, or pressure sensitive).

7.5 Special marking. A colorless, identification marking of sufficient permanence to withstand a minimum of 3 washings or 3 dry cleanings may be used on the backs of fastener tapes. Infra-red reflective markings are not permissible.

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7.6 Slitting. When multiple widths are woven as a single unit, the tapes may be ultrasonically slit to widths leaving selvages as specified, on the edges of each tape.

7.7 Titles of Non-Government test methods

ASTM-D-3776 Mass Per Unit Area (Weight) of Fabric
ASTM-D-5034 Breaking Force and Elongation of Textile Fabrics (Grab Test)
AATCC 61 Colorfastness to Laundering, Home and Commercial: Accelerated
AATCC 132 Colorfastness to Dry Cleaning
ASTM-D-2261 Tear Strength of Fabric by the Tongue (Single Rip) Procedure.

7.8 Sources that could be used but not limited to, are as follows:

- a. Velcro Group Corp.
- b. YKK, Inc.

MILITARY INTERESTS:

Custodians:

Army - GL
Navy - NU
Air Force - 99

CIVIL AGENCY COORDINATING
ACTIVITY:
GSA - FSS

Review Activities:

Army - MD
Navy - OS, AS, MC
Air Force - 45, 82

PREPARING ACTIVITY:
DLA - CT

Project 8315-0402