

INCH-POUND

A-A-55126C

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SUPERSEDING

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## 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.

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 and extruded fastener tapes are intended to be used as closures for equipment and clothing. Users should determine which type and class of hook and loop fastener tape meets their requirements

2. **CLASSIFICATION.** The following types, classes, styles, and widths of hook and loop fastener tapes are specified in this document:

#### 2.1 Types. (Hook Fastener Tape only)

Type I - Woven hook fastener tape, 6.5 millimeters

Type II - Woven hook fastener tape, 8.0 millimeters

Type III - Extruded plastic hook fastener tape, Non-Autoclave

Type IV - Extruded plastic hook fastener tape, Autoclave Resistant

**NOTE:** Loop fastener tapes are not specified by type. The loop fastener tape is specified only by class (see 2.2) to specify the fiber content and the description of the edge as with or without a selvage. For the fiber content and edge description of the hook and loop fastener tape match, see 3.1.

Beneficial comments, recommendations, additions, deletions, clarification, etc. and any other data that may improve this document should be sent to: Attn: DLA Troop Support, 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 <https://assist.dla.mil>.

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2.2 Classes. (Hook, Loop, and self-engaging fastener tapes)

Class 1 - 100% nylon with selvage

Class 2 - Deleted (see 7.6)

Class 3 - 100% polyester with selvage

Class 4 - 100% nylon without selvage

Class 5 - 100% polyester without selvage

Class 6 - Warp Knit Loop 100% nylon without selvage

Class 7 - Circular Knit Loop 100% nylon without selvage (see 3.2.2.3)

Class 8 - Laminated Circular Engagement (LCE) fastener, back to back, nylon and polyethylene without selvage

2.3 Colors. As specified in contract (see 7.7)

Style A: Solid colors (hook and loop)

Style B: Universal Camouflage Pattern (UCP) (loop only)

Style C: Operation Enduring Freedom Camouflage Pattern (OEF-CP) (loop only)

Style D: Operational Camouflage Pattern (OCP) (loop only)

2.4 Widths. The hook and loop fastener tape for Classes 1, 3, and 5 shall conform to the following widths. The hook and loop for Classes 7-9 shall be available in various widths.

Width, inches	4	2	1 1/2	1	3/4	5/8
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## 3. SALIENT CHARACTERISTICS

3.1 Fastener tape material (all types and classes). The woven hook and loop fastener tapes (all) shall be fabricated of synthetic fibers and yarns. The Types III and IV, Class 4 hook fasteners shall be made using extruded plastic nylon resin. The Classes 1 and 4 hook and loop fastener tapes shall be 100 percent nylon. The Class 3 and Class 5 hook and loop fastener tapes shall be all 100 percent polyester (see 2.2). Class 4 and 5 tapes may be slit in widths ranging from 5/8-inches to 4-inches with non-fraying edges. All selvages (including the 4-inch wide tape) shall not exceed 1/8-inch. The tolerance for each width of woven tape (selvage or non- selvage) shall be  $\pm 1/16$ -inch (including selvage when applicable) except the 4-inch tape which shall be  $\pm 1/8$ -inch. Width tolerances for the extruded tape shall be  $\pm 1/32$ -inch. Unless otherwise specified in the end item, tapes shall exhibit the same edge finish on both sides of the tape (both sides either have a selvage or both sides do not have a selvage and shall utilize same class hook fastener tape).

3.2 Construction.3.2.1 Hook fasteners tapes.

3.2.1.1 Construction of woven hook fastener tape (Type I and II, Classes 1, 3, 4, and 5). The hook fastener tape shall be a woven, warp loop, narrow fabric construction, with multifilament

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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 a leno weave, woven in a staggered order. The Type I hook fastener tape shall be made using a 6.5 millimeters, 200 denier hook, and the Type II hook fastener tape shall be made using 8.0 millimeters, 300 denier hook. The hook fastener tapes (Type I and II) shall be visually examined for conformance to construction. One (1) determination per sample unit shall be made and the results reported as “pass” or “fail”.

3.2.1.2 Construction of extruded hook fastener tape (Type III and IV). The extruded hook fastener tape shall be a continuous extrusion of plastic nylon resin. Type III, Class 4 (only) hook fastener tape shall have fully formed hooks that are a minimum height of 0.025-inch with alternating rows and containing a minimum of 375 hooks per square inch. Type IV, Class 4 (only) hook fastener tape shall have fully formed hooks that are a minimum height of 0.035-inch with alternating rows and containing a minimum of 725 hooks per square inch. The hook fastener tapes (Type III and IV) shall be visually examined for conformance to construction. One (1) determination per sample unit shall be made and results reported as “pass” or “fail”.

### 3.2.2 Loop fasteners tapes.

3.2.2.1 Loop fastener tape (Classes 1, 3, 4 and 5). The loop fastener tape shall be a woven, warp loop, narrow fabric construction, with multifilament ground ends (including selvages) and picks, with leno woven loop warp ends. The loops 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 yarns that provide a uniformly disoriented surface without being napped. The loop fastener tapes shall be visually examined for conformance to construction. One (1) determination per sample unit shall be made and the results reported as “pass” or “fail”.

3.2.2.2 Loop fastener tape (Class 6). The loop fastener tape shall be low profile warp knit nylon sheeting with a maximum thickness of 0.11-inches, constructed without selvage. The loops shall be suitably napped to form a uniformly disorientated surface of uncut loops capable of being engaged by the hook fastener tape. The loop fastener tape shall be visually examined for conformance to construction. One (1) determination per sample unit shall be made and the results reported as “pass” or “fail”.

3.2.2.3 Loop fastener tape (Class 7). The loop fastener tape shall be a circular knit nylon sheeting without selvage. The loops shall be suitably napped to form a uniformly disorientated surface of uncut loops capable of being engaged by the hook fastener tape. The loop fastener tape shall be visually examined for conformance to construction. One (1) determination per sample unit shall be made and the results reported as “pass” or “fail”.

3.2.2.4 Laminated Circular Engagement (LCE) (Class 8). A Self Engaging Fastener (SEF) that is constructed by mechanically bonding hook and loop tape together in a back-to-back orientation that enables the fastener to self-engage and allows the fastener to encompass, grip or bind some specified item thereof under pressure. Product uses a two (2) - way extruded high-density polyethylene tape at 900 hooks per square inch that is mechanically bonded to back side

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of brushed nylon warp knit loop. Design offers two (2) methods of engagement either with loop side or hook side facing out. The loop fastener tape shall be visually examined for conformance to construction. One (1) determination per sample unit shall be made and the results reported as “pass” or “fail”. Available in widths as specified in the contract or purchase order, but not to exceed 6-inches.

3.3 Physical requirements. The finished hook and loop fastener tape shall conform to the physical characteristics of Table I and II when tested as specified in Table III.

TABLE I. Physical requirements.

Characteristic	Width Hook/Loop Fastener Tape (inches)					
	4	2	1-1/2	1	3/4	5/8
<b>Weight, grams/linear yard, (min.):</b>						
Hook: Type I Classes 1 and 4	14.4	9.0	6.9	4.5	3.4	2.8
Type II Classes 1 and 4	15.2	9.4	6.9	4.7	3.5	2.8
Classes 3 and 5	-	10.6	-	5.6	-	-
Type III and IV Class 4	32.0	16.0	12.0	8.0	6.0	5.0
Loop: Classes 1 and 4	22.4	12.6	9.4	5.9	4.1	3.4
Classes 3 and 5	-	10.4	-	5.3	-	-
Class 6	23.6	11.8	8.8	5.8	4.4	3.6
Class 7	29.0	14.2	10.5	7.3	5.2	4.5
Class 8	52.8	26.4	19.8	13.2	9.9	8.2
<b>Breaking Strength, lbs. (min.):</b>						
Hook: Type I Classes 1 and 4	320	170	115	90	70	65
Type II Classes 1 and 4	320	170	135	100	80	65
Classes 3 and 5	-	230	-	130	-	-
Type III and IV Class 4	-	-	-	-	-	-
Loop: Classes 1 and 4	280	165	120	75	50	43
Classes 3 and 5	-	175	-	95	-	-
Classes 7 and 8	-	-	-	-	-	-
Class 8	174	87	65	43	32	27

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TABLE I. Physical requirements. - Continued

Characteristic	Width Hook/Loop Fastener Tape (inches)					
	4	2	1-1/2	1	3/4	5/8
<b>Shear strength, lbs./2 sq. inch (min.)</b> <b>After 3 Launderings or after 1 dry cleaning <u>1</u>/</b>						
Hook: Type I Classes 1 and 4	5.0	5.0	5.0	5.0	4.7	4.3
Type II Classes 1 and 4	10.0	10.0	10.0	10.0	6.7	4.7
Classes 3 and 5	-	16.0	-	16.0	-	-
Class 7	4.3	4.3	4.3	4.3	4.3	4.3
Type III Class 4	15.0	15.0	15.0	15.0	11.2	9.3
Type IV Class 4 with Class 6 loop (unlaundered)	13.0	13.0	13.0	13.0	9.7	8.0
Class 8	8.0	8.0	8.0	8.0	6.0	5.0
<b>Peel strength, lbs./inch (min.)</b> <b>After 3 launderings or after 1 dry cleaning <u>1</u>/</b>						
Hook: Type I Classes 1 and 4	0.5	0.5	0.5	0.5	0.5	0.5
Type II Class 1	1.0	1.0	1.0	1.0	1.0	1.0
Classes 3 and 5	-	0.5	-	0.5	-	-
Class 7	0.1	0.1	0.1	0.1	0.1	0.1
Type III Class 4	0.8	0.8	0.8	0.8	0.8	0.8
Type IV Class 4 with Class 6 loop (unlaundered)	0.2	0.2	0.2	0.2	0.2	0.2
Class 8	0.15	0.15	0.15	0.15	0.15	0.15

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TABLE I. Physical requirements. - Continued

Characteristic	Width Hook/Loop Fastener Tape (inches)					
	4	2	1-1/2	1	3/4	5/8
<b>Stitch Tear Strength, lbs. (min.)</b>						
Hook: Type I Classes 1 and 4	3.5	3.5	3.5	3.5	3.5	3.5
Type II Classes 1 and 4	3.5	3.5	3.5	3.5	3.5	3.5
Classes 3 and 5	2.0	2.0	2.0	2.0	2.0	2.0
Type III Class 4	2.5	2.5	2.5	2.5	2.5	2.5
Type IV Class 4	-	-	-	-	-	-
Loop: Classes 1 and 4	6.0	6.0	6.0	6.0	6.0	6.0
Classes 3 and 5	3.5	3.5	3.5	3.5	3.5	3.5
Classes 7, 8, and 9	-	-	-	-	-	-

1/ Dry cleaning only required if specified in the contract

TABLE II. Physical requirements (All widths).

Characteristic	Hook				Loop			LCE
	Type I	Type II	Type III	Type IV	Class 1-5	Class 6 <u>1/</u>	Class 7	Class 8
Thickness (in.) (min.)	0.05	0.05	0.04	0.04	0.07	0.11 (max.)	0.07	0.07
Dimensional Stability Length, % (max)	3.0	3.0	3.0	-	4.0	4.0	4.0	4.0
Autoclave (Thermal Shrinkage) Length % (max)	-	-	-	3.0	-	-	-	-
Stiffness, inch pounds (Class 4 only) (max.)	-	-	0.07	-	-	-	-	-

1/ For Class 6 only

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TABLE III. Test methods.

Characteristic	Requirement reference	Test method
Fiber Identification	3.1	ASTM D276 or AATCC 20
Weight	Table I	ASTM D3776?D3776M, Option D <u>1/</u>
Breaking strength	Table I	ASTM D5035 (G-E or G-T) <u>2/</u> , <u>3/</u>
Shear strength		<u>4/</u> , <u>5/</u> <u>6/</u>
After 3 launderings	Table I	AATCC 61, Test 3A, ASTM D5169
After 1 dry cleaning	Table I	AATCC 132, ASTM D5169 <u>7/</u>
After Autoclaving (Type IV only) (see 5.5)	Table I	ASTM D5169 <u>8/</u>
Peel strength		<u>4/</u> , <u>6/</u>
After 3 launderings	Table I	AATCC 61, Test 3A, ASTM D5170
After 1 dry cleaning	Table I	AATCC 132, ASTM D5170 <u>7/</u>
Stitch tear strength	Table I	ASTM D2261, Option 1 <u>9/</u> , <u>13/</u>
Thickness	Table II	ASTM D1777, Option 5 <u>10/</u>
Dimensional Stability (Length)	Table II	AATCC 135 Option 3, V, Aiii
Autoclave(Thermal) Length Shrinkage(Type IV only)	Table II	<u>8/</u>
Stiffness Type III, Class 4, Hook only	Table II	ASTM D747 <u>11/</u> , <u>12/</u>
Spectral Reflectance	3.8 - 3.8.3	3.8.4
Fray Resistance <u>13/</u>	3.11	3.11.1 –3.11.2.1.2, Table VI, VII, and Figures 1, 2, and 3.

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

2/ When splices are tested for breaking strength, the splice shall be centered between the jaws.

3/ For break strength the contractor may exercise the option to use either the jaws specified, except that the jaws shall be 1-inch by 3-inch, or an approved commercial cam type clamp.

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

5/ For a 2-inch linear overlap. Tapes over 1-inch are slit to 1-inch prior to testing. Tapes under 1-inch are tested as is.

6/ Test shear strength and peel strength with corresponding loop class tape.

7/ If specified in the contract.

8/ The steam autoclave aging shall be conducted in any autoclave apparatus that can maintain a steam temperature of 252 ( $\pm 2$ )°F at 15 pounds per square inch (psi) for 30 minutes. Premark the back of the tape with indelible ink for shrinkage. Tape shall not touch any metal in the autoclave unit and shall be air dried before testing. No curling shall be present after autoclaving.

9/ Five (5) 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 shall then be cut from the start edge to the first hole making a 3-inch tab for testing.

10/ Testing shall be done at 0.1 psi.

11/ Test with hook side up.

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12/ Stiffness (bending moment) shall be conducted in accordance with ASTM D747 except as follows:

- a. Unless otherwise specified, the testing conditions shall be in accordance with ASTM D1776/D1776M.
- b. The test specimen shall be a rectangle of cloth of dimensions 2-inch by 1-inch with the long dimension parallel to the fabric direction under test, warp or filling, as applicable.
- c. The load scale reading shall be recorded only at the specimen angular deflection of 60 degrees.
- d. The stiffness is the bending moment of specimen at a deflection angle of 60 degrees and shall be calculated to three significant figures as follows:

$$\text{Bending moment, in.-lb.} = \frac{\text{Load scale reading} \times \text{moment weight}^*}{100}$$

\* Testing machine of Tinius Olsen Testing Machine Co.

13/ Adhesive backed fasteners shall not be evaluated for fray resistance and stitch tear strength

3.4 Color. The color for the hook and loop fastener tapes shall be as specified in the applicable end item specification or in the contract (see 7.7).

3.4.1 Visual color matching. The color and appearance of the finished hook and loop fastener tapes 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 an incandescent lamplight at 2856 ( $\pm$  200) K.

3.4.2 Colorfastness. The finished hook and loop fastener tapes shall conform to the colorfastness properties as specified and tested in Table IV. Colorfastness requirements shall not apply to the Type III and IV hook fastener tapes.

TABLE IV. Colorfastness requirements and test methods (all Classes).

Colorfastness Evaluation <u>1/</u>	Laundering (3 cycles) <u>4/</u>	Light (after 40 AFUs or 170kJ/(m <sup>2</sup> nm) @ 420nm) <u>5/</u> , <u>6/</u>	Dry Cleaning (1 cycle) (min.) <u>7/</u> , <u>8/</u>	Crocking Dry/Wet (min.) <u>9/</u> , <u>10/</u>
Style A (Solids) All colors <u>2/</u>	3-4	3-4	3-4	3.5
Style B (UCP) All colors <u>3/</u>	2-3	4-5	4.5	4.0
Style C (OEF-CP) and Style D (OCP) <u>2/</u>				
Tan 499, Olive 527	3-4	3	-	3.5



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TABLE IV. Colorfastness requirements and test methods (all Classes). -Continued

Colorfastness Evaluation <u>1/</u>	Laundering (3 cycles) <u>4/</u>	Light (after 40 AFUs or 170kJ/(m <sup>2</sup> nm) @ 420nm) <u>5/</u> , <u>6/</u>	Dry Cleaning (1 cycle) (min.) <u>7/</u> , <u>8/</u>	Crocking Dry/Wet (min.) <u>9/</u> , <u>10/</u>
Dark Green 528 Brown 529	3-4	3-4	-	3.5
Dark Cream 559	3-4	3	-	3.5
Bark Brown 561	3-4	3-4	-	3.5

1/ Adhesive backed fasteners shall not be evaluated for colorfastness.

2/ Using AATCC Test Method 61, 2A

3/ Using AATCC Test Method 61, 3A

4/ Rated using the AATCC Evaluation Procedure 1, Gray Scale for Color Change and AATCC Evaluation Procedure 2, Gray Scale for Staining

5/ Using AATCC Test Method 16.2, Option 1 or 16.3, Option 3

6/ Rated using the AATCC Evaluation Procedure 1, Gray Scale for Color Change

7/ Using AATCC Test Method 132

8/ If specified in the contract

9/ Using AATCC Test Method 8

10/ Rated using the AATCC Evaluation Procedure 8, AATCC 9-Step Chromatic Transference Scale.

3.5 Solid colors (Style A – hook and loop). Solid colors for the hook and loop shall be in accordance with the end item specification or in the contract (see 7.4 and 7.7) and it shall be in one (1) of the following colors: Camouflage Green 483, Coyote 498, Foliage Green 504, Tan 499, Black, or White.

3.6 Dyeing/printed of loop only (Style B, C and D).

3.6.1 Universal Camouflage Pattern (Style B). The printed loop shall be dyed to a ground shade either matching or approximating Desert Sand 500 and then overprinted with the camouflage pattern. When the ground shade is dyed to match Desert Sand 500, the remaining two (2) colors shall be printed as appropriate, for the Urban Gray 501 and Foliage Green 502 areas of the pattern. When the ground shade is not dyed to approximate Desert Sand 500, all three (3) colors of the camouflage pattern shall be printed to match all three (3) colors of the pattern.

3.6.2 Operation Enduring Freedom Camouflage Pattern (Style C) and Operational Camouflage Pattern (Style D) 4 colors. The printed loop shall be dyed to a ground shade to match Tan 499 and then it shall be overprinted with the remaining three (3) camouflage colors (Olive 527, Brown 529 and Dark Green 528).

3.6.3 Operational Camouflage Pattern (Style D) 5 colors. The printed loop be dyed to a ground shade to match Dark Cream 559 and then it shall be overprinted with the remaining four (4) camouflage colors (Olive 527, Brown 529, Dark Green 528, and Bark Brown 561).

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3.7 Pattern execution. The pattern on the printed loop only (when applicable) shall reproduce the standard sample in respect to design and colors of the respective area/colors. When the standard sample is not referenced for pattern execution, a pattern drawing shall be provided and the pattern shall match that of Drawing 2-1-2519, Universal Camouflage Pattern (UCP), Drawing 2-1-2592 for respective colors in Operational Camouflage Pattern (OCP) (see 7.1.2).

3.8 Spectral reflectance (solid colors). The reflectance values for the loop (only) in solid colors for all Types shall conform to the requirements listed below in Table V when tested as specified in 3.8.4.

TABLE V. Spectral reflectance requirements, reflectance values % (solids) (loop side only).

Wavelength, (Nanometers)	Foliage Green 504		Camouflage Green 483		Tan 499		Coyote 498	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
600	8	26	3	10	8	26	8	20
620	8	26	3	10	8	26	8	20
640	8	28	3	10	8	30	8	22
660	10	30	3	11	8	34	8	24
680	10	34	3	13	12	38	12	24
700	12	38	4	28	12	40	12	34
720	16	42	5	40	16	46	16	42
740	16	46	7	52	22	50	22	46
760	18	48	11	60	30	50	30	50
780	18	48	17	64	34	54	34	54
800	20	50	24	67	36	56	36	56
820	22	54	32	70	38	58	38	58
840	24	54	37	71	38	58	38	58
860	26	56	40	73	40	60	40	60

3.8.1 Universal Camouflage Pattern (UCP) spectral reflectance. The reflectance values for the printed loop shall conform to the requirements listed below in Table V-1, when tested as specified in 3.8.4.

TABLE V-1. UCP spectral reflectance requirements, reflectance values % (loop side only).

Wavelength, (Nanometers)	Desert Sand 500		Urban Gray 501		Foliage Green 502	
	Min.	Max.	Min.	Max.	Min.	Max.
600	28	40	12	26	8	18
620	30	42	14	26	8	18
640	34	48	14	28	8	20
660	38	56	14	30	10	26
680	44	60	18	34	10	26

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TABLE V-1. UCP spectral reflectance requirements, reflectance values % (loop side only). -  
Continued

Wavelength, (Nanometers)	Desert Sand 500		Urban Gray 501		Foliage Green 502	
700	46	66	24	38	12	28
720	48	68	26	42	16	30
740	48	72	30	46	16	30
760	50	74	32	48	18	32
780	54	76	34	48	18	34
800	54	76	34	50	20	36
820	54	7	36	54	22	38
840	55	78	38	54	24	40
860	56	78	40	56	26	42

3.8.2 Operation Enduring Freedom Camouflage Pattern (OEF-CP) and Operational Camouflage Pattern (OCP) 4 colors spectral reflectance. The reflectance values for the printed loop shall conform to the requirements listed below in Table V-2, when tested as specified in 3.8.4.

TABLE V-2. OEF-CP and OCP (Style C and D) 4 colors spectral reflectance requirements, reflectance values % (loop side only).

Wavelength, Nanometers (nm)	Tan 499		Olive 527 Brown 529		Dark Green 528	
	Min.	Max.	Min.	Max.	Min.	Max.
600	8	26	10	30	3	12
620	8	26	11	30	3	12
640	8	30	11	32	4	12
660	8	34	12	32	4	13
680	12	38	14	35	4	18
700	12	40	19	40	6	25
720	16	46	22	43	6	27
740	22	50	25	46	10	29
760	30	50	27	48	14	33
780	34	54	28	50	18	36
800	36	56	29	50	20	37
820	38	58	30	51	20	38
840	38	58	32	51	21	39
860	40	60	33	52	21	40

3.8.3 Operational Camouflage Pattern (OCP) 5 colors spectral reflectance. The reflectance values for the printed loop shall conform to the requirements listed below in Table V-3, when tested as specified in 3.8.4.

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TABLE V-3. OCP (Style D) 5 colors spectral reflectance requirements, reflectance values % (loop side only).

Wavelength, Nanometers (nm)	Dark Cream 559		Olive 527 Brown 529		Dark Green 528 Bark Brown 561	
	Min.	Max.	Min.	Max.	Min.	Max.
600	22	44	10	30	3	12
620	24	45	11	30	3	12
640	24	45	11	32	4	12
660	25	45	12	32	4	13
680	28	45	14	35	4	18
700	28	48	19	40	6	25
720	30	52	22	43	6	27
740	32	55	25	46	10	29
760	36	56	27	48	14	33
780	38	57	28	50	18	36
800	40	57	29	50	20	37
820	44	58	30	51	20	38
840	46	59	32	51	21	39
860	48	60	33	52	21	40

3.8.4 Spectral reflectance test. Spectral reflectance data for all specified Solid colors (Style A) or printed camouflage colors (Style B, C, and D) shall be determined on the face side and shall be obtained from 600 to 860 nanometers (nm) at 20 nm intervals on a spectrophotometer relative to the polytetrafluoroethylene (PTFE) family of compounds, the preferred white standard. Other white reference materials may be used provided they are calibrated to absolute white or vitrolite tiles. The spectral band width shall be less than 20 nm at 860 nm. Reflectance measurements shall be made by either the monochromatic or polychromatic mode of operation. When the polychromatic mode of operation is used, the spectrophotometer shall operate with the specimen diffusely illuminated with the full emission of a continuous source that simulates either CIE Source A or CIE Source D65. The specimen shall be measured as a single layer only on the loop fastener tape. Measurements shall be taken on a minimum of two (2) different areas and the data averaged. The specimen shall be viewed at an angle no greater than 10° from normal, with the specular component included. Specimens shall be oriented in different directions during testing. Camouflage materials (Style B, C, and D) should be measured with the appropriate aperture size to ensure that only one (1) color is measured at a time. The diameter for standard aperture size used in the color measurement device shall be 1.0 to 1.25-inches for most solid colors and 0.3725-inches for the UCP, OEF-CP, and OCP (always use the largest aperture possible). Photometric accuracy of the spectrophotometer shall be within one (1) percent and wavelength accuracy within 2-nm. Any color having spectral reflectance values falling outside the limits at four (4) or more of the wavelengths specified shall be considered a test failure. NOTE - For Operation Enduring Freedom Camouflage Pattern (OEF-CP) and Operational Camouflage Pattern (OCP), all color evaluations shall be performed on the solid color area and not the tonal area.

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### 3.9 Finish.

3.9.1 Finish (Type I, Type II and Type IV only). All hook and loop fastener tapes shall be stabilized as necessary to allow for maximum flatness, fray resistance (see 3.11), and dimensional stability. In addition, the back of each Classes 1, 3, 4 and 5 hook fastener tapes shall be coated with a polymeric or elastomeric undercoating to prevent fraying.

3.9.2 Adhesive backings. When adhesive backing is specified per contract or end-item application, the fastener tapes shall be coated with an adhesive backing (except for selvages). Adhesive backed products shall not be evaluated for fray, stitch tear, and colorfastness. As a minimal test, adhesive shall be capable of sticking securely to either stainless steel or aluminum sheeting per manufacturer instructions for minimum of 24 hours with no lifting or delamination in room, heat or cold temperatures specified. See contract or end-item requirements for overall test method and minimum peel strength requirements.

3.10 Splicing. When spliced tape is furnished, care shall be taken to assure that splices are smooth and properly aligned with edges 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 not be less than 30 percent of the required value of the un-spliced tape when tested in accordance with Table III except that the jaws shall be 1-inch by 3-inches. The length of the overlap of the splices shall be 5/16-inch 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.

3.11 Fray resistance. Unless otherwise specified by the contract or end item document (see 7.7), all hook and loop fastener tapes (except Type III and Type IV Class 4 hook fastener tape and Class 6, Class 7, and Class 8) shall exhibit resistance to fraying when tested as specified below using either 3.11.1 for general purpose or 3.11.2 for test pad procedure.

3.11.1 Fray resistance for general purpose (slit tape procedure) (any width). Five (5) specimens each of the hook and loop fastener tapes shall be tested in accordance with AATCC 135, Option 3, V, Aiii for fray resistance after three (3) launderings, and in accordance with AATCC 132 for fray resistance after one dry cleaning, or commercial dry cleaning using AATCC 158 (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. Each hook and loop shall be laundered separately. After laundering, or dry cleaning of the tapes with slit selvages, the center and outside edges 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).

3.11.2 Fray resistance for test pad procedure. No hook or loop fastener tape shall exhibit any fraying edges and peeling yarns that detracts from the appearance and durability of tape when tested as specified below unless otherwise specified in the contract (see 7.7). This test shall only be conducted for the Army Combat Uniform (ACU) or other end items as specified. The hook and loop fastener tapes shall show no more than 1/32-inch fraying after 15 launderings or dry cleaning (when applicable).

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3.11.2.1 Fray test procedure - This procedure shall be used to fabricate one (1) set of fray pad test samples to evaluate the fray resistance of a hook and loop fastener tape.

3.11.2.1.1 Assembly of fray test pad. A fray pad set consists of two (2) pad samples: one (1) pad sample consists of hook fastener tape pieces on both sides of the fabric outer surfaces and the other one (1) pad sample consists of loop fastener tape pieces on both sides of the fabric outer surfaces. The hook and loop used on the pad should be the widths as specified on the end item garment. The fray test pad assembly procedures and pad preparation shall be as specified in Table VI (see Figures 1, 2, and 3).

TABLE VI. Fray test pad assembly.

Step	Procedure
1. Cut fabric panels	Cut four (4) fabric panels approximately 21-inches by 21-inches from ground material used in garment.
2. Cut hook and loop tape pieces	Hook and loop pieces should be cut in accordance with Table VII in length.
3. Position hook and loop tape on fabric panels	a. Hook: Evenly space one piece of each width lengths on one (1) fabric panel and mark locations. Repeat procedure with remaining hook pieces on second fabric panel.
	b. Loop: Evenly space one piece of each width lengths on one (1) fabric panel and mark locations. Repeat procedures with remaining loop pieces on second fabric panel.
4. Stitch hook and loop tape to fabric panels	Position and stitch hook or loop tape on previously marked locations by using the following requirements: Thread Type: Cotton (Type I) or polyester-covered, polyester core (Type II) per A-A-50199 Thread Size: Tex size 36 to 45 for Type I and II of A-A-50199 Stitch Type: 301, ASTM D6193 Seam Type: SSau-4 (Top stitch four (4) sides), ASTM D6193 Gauge: 1/8-inch to 3/16-inch from selvage using box stitch at 9-11 stitches per inch (see Figure 1) For the 4-inch loop fastener tape vertically center stitch using 301 stitch type (see Figure 1)

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TABLE VI. Fray test pad assembly. - Continued

Step	Procedure
5. Initial pad assembly	a. Take the 21-inch fabric panels and face to each other, stitch inside out on three (3) panel edges using the following requirements. When finished, the assembly should look like a bag measuring approximately 20-inches by 20-inches (one (1) bag with just hook and one (1) bag with just loop).
	b. See step 4 for thread type, size, and stitch type.
	c. Seam Type: SSa-1, ASTM D6193
	d. Seam allowance approximately 1/2-inch
	e. Turn bag right side out
6. Fill pad	Insert sufficient number of fabric squares into partially assembled pad to achieve a 1.0-pound minimum weight per fray test pad. Fabric squares should be cut to fit inside the bag and lay flat. Filling material may be of any textile fabric without a water repellent finish.
7. Complete pad assembly	a. Fold-in seam allowance along open edge; top stitch with 301 Stitch Type
	b. Secure fabric squares to pad. Top stitch two (2) sides of the pad, approximately 2-inches into the pad. Careful not to catch hook or loop tapes on either side. Finished pad should remain flat without any lumps throughout laundering.

TABLE VII. Hook and loop fastener test pieces for fray test pad.

Tape Length (inches)	Tape Width (inches)			
	5/8	1	2	4
Hook fastener tape (Type I-II) # of samples by length (inches)	1 at 13.0	1 at 4.5	Not applicable	Not applicable
Loop fastener tape # of samples by length (inches)	1 at 13.0	2 at 10.0	1 at 2.0	2 at 6.0

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NOTE: The information under columns 2-5 refers to number of samples at certain length. For example "1 at 13" is referring to one (1) sample at 13-inches in length for the corresponding tape width of 5/8-inches.

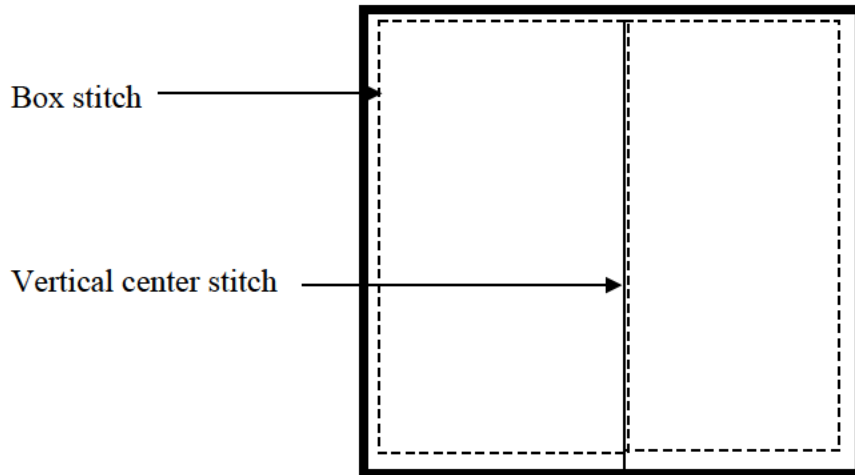


FIGURE 1. Example of 4-inch loop stitching.

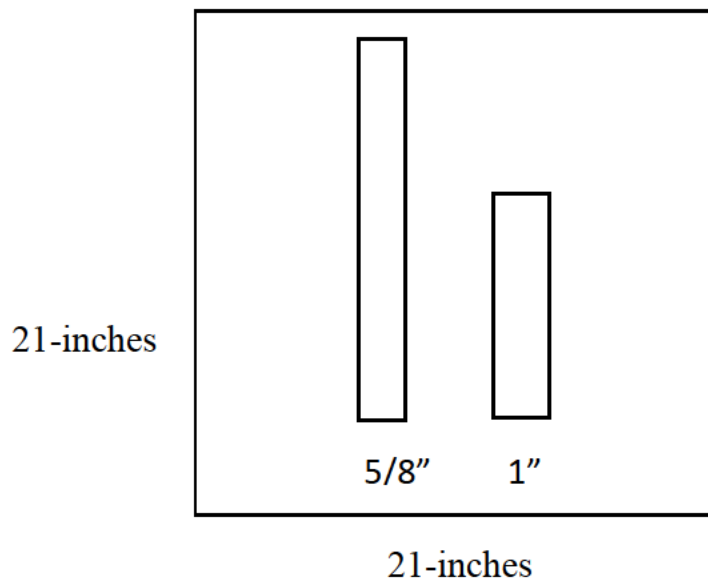


FIGURE 2. Example of hook layout fray test pad.



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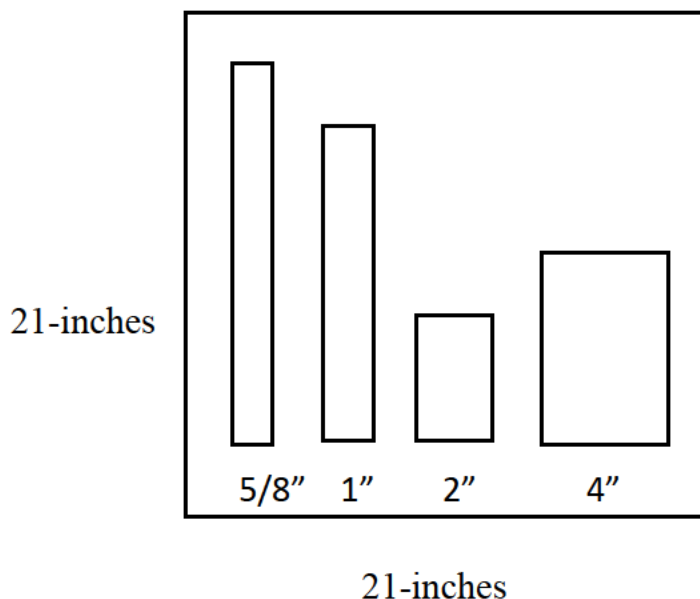


FIGURE 3. Example of loop layout fray test pad.

3.11.2.1.2 Laundering of fray test pad. The fray test pads shall be laundered 15 cycles in accordance with AATCC 150, Option 3, (V), Aiii. The hook and loop fastener tapes shall show no more than 1/32-inch fraying after 15 launderings.

3.12 Toxicity. The finished fasteners tapes shall not present a health hazard and shall show compatibility with prolonged, direct skin contact when tested as specified in 5.4. Chemicals recognized by the Environmental Protection Agency (EPA) as human carcinogens shall not be used.

3.13 Length and put-up. Unless otherwise specified in the contract, 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 3-feet. There shall be no more than one (1), 3-foot length in any spool. For every 25-yards length on a spool, there shall be no more than three (3) splices or four (4) 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.

3.14 Labels. Each roll of finished hook and loop shall be labeled or ticked for fiber content in accordance with the Rules and Regulations under the Textile Fiber Products Identification Act.

3.15 Workmanship. The finished hook and loop shall conform to the quality of product established by this document and shall be thoroughly cleaned and all loose thread and foreign matter removed.

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4. **REGULATORY REQUIREMENTS.** Unless otherwise specified 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. **PRODUCT CONFORMANCE PROVISIONS.**

5.1 Product Conformance. The fasteners tapes provided shall meet the salient characteristics of this Commercial Item Description (CID), 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 Sampling. Sampling for inspection shall be performed in accordance with ANSI/ASQ Z1.4 (see 7.2.4) and with quality acceptance limits as specified in the contract and/or order, except where otherwise indicated.

5.3 Visual examination. Each lot shall be examined for the following defects. Any hole, cut, or tear; color not as specified; any part shaded; any streaks; any spot or stain (topside); raw edges; width of tape or selvages not as specified; any missing or broken yarn; hooks or loop flattened; uneven pile; splices not sealed; splices not color matching; splicing not even; slit edges not as specified; label missing, incorrect, or illegible; required information missing from the label; length less than indicated on the ticket per commercial standards; not packaged in accordance with contract or purchase order shall be considered a defect.

5.4 Toxicity test. When required (see 7.7), an acute dermal irritation study and a skin sensitization study shall be conducted on laboratory animals. When the results of the studies indicate the apron 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 3.12) can be demonstrated with historical use data, toxicity testing may not be required.

5.5 Autoclave resistance. Type IV hook products shall be tested annually for Autoclave Resistance as defined by Table III against performance defined in Table II. Test report shall include individual results of the testing with any additional information specified in the contract or purchase order (see 7.7)

5.6 Colorfastness to light. If specified by the contract or end item document (see 7.7), annual colorfastness testing to light (all classes) shall be permitted as defined by Table IV. Test report shall include individual results of testing with any additional information specified in the contract or purchase order.

5.7. Acceptance criteria. Acceptance criteria shall be as specified in the contract or purchase order (see 7.7).

6. **PACKAGING**

6.1 Packaging. Preservation, packing, and marking shall be as specified in the contract or purchase order (see 7.7).

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## 7. NOTES

7.1 Sources of Government documents.

7.1.1 Copies of Government documents are available online at <http://quicksearch.dla.mil>

7.1.2 Copies of drawings are available from the U.S. Army Natick Soldier Research Development and Engineering Center, ATTN: RDNS-SEW-EWC, 10 General Greene Avenue Natick, MA 01760-5019.

7.1.3 Federal Acquisition Regulations are available online at <http://acquisition.gov/far/index.html>

7.2 Sources for Non-Government Documents.

7.2.1 AATCC test methods are available online at <http://www.aatcc.org>

7.2.2 ASTM Standards are available online at <http://www.astm.org>

7.2.3 Modified Draize Procedure: Principles and Methods of Toxicology, A Wallace Hayes (editor), are available online from <http://www.taylorandfrancis.com> or <https://www.crcpress.com>

7.2.4 American Society for Quality (ASQ) documents are available online at <http://asq.org>

7.3 Applications. The hook and loop fasteners tapes are intended to be used as closures or to secure items. Type I and II hook fastener tapes are for general purpose applications. Type III and IV hook fastener tapes are intended to eliminate field fraying, minimize contamination (lint) of hook area, and is generally thinner and more flexible. Class 1 and 4 hook and loop fastener tapes are intended for general purpose applications. Class 3 and 5 hook and loop fastener tapes are intended for applications where resistance to wetting, high humidity or to UV radiation is required. Class 6 is intended for large areas, where a lower profile loop with greater drape is desired. Class 7 is intended for large areas of coverage with a greater drape loop is required. Class 8 is intended to secure loose ends or webbing, wrapping loose items or to provide guidance and retention of items.

7.4 Standard sample. For access to drawings and standard shade sample of the fasteners tapes, address the contracting activity issuing the invitation for bids or request for proposal.

7.5 Slitting and splicing. 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.

7.6 Class 2, Flame Resistant (FR) hook and loop. Class 2 has been deleted due to the unavailability of solution dyed meta-aramid in the USA. Class 2 is not Berry Amendment compliant.

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

- a. Title, number, and date of this Commercial Item Description (CID)
- b. Type, class, style, and width required (see 2)
- c. Solid color/print required (see 3.4, 3.5 and 3.6)
- d. Colorfastness to dry cleaning if required (see 3.4.2)
- e. Use of spliced tape (see 3.10)
- f. Fray resistance requirement (see 3.11)
- g. Put-up required if other than specified (see 3.13)
- h. Product conformance provisions (see 5.1)
- i. When toxicity testing is required (see 5.4)
- j. Autoclave Resistance (see 5.5)
- k. Annual colorfastness to light testing if required (see 5.6)
- l. Acceptance criteria provisions (see 5.7)
- m. Packaging requirement (see 6.1)

7.8 Key words.

Camouflage pattern  
Combat clothing, Army  
Individual equipment  
Plastic, extruded nylon

MILITARY INTERESTS:

Custodian:

Army- GL  
Navy- NU  
Air Force- 11

Review Activities:

Army- MD  
Navy- AS, OS, MC

CIVIL AGENCY COORDINATING ACTIVITY:

GSA-FAS

PREPARING ACTIVITY:

DLA –CT  
Agent – Army-GL

Project Number: 8315-2016-001

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using ASSIST Online database at <https://assist.dla.mil>.