

MIL-B-52489E
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SUPERSEDING
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MILITARY SPECIFICATION

BARBED TAPE, CONCERTINA

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

1. SCOPE

1.1 Scope. This specification covers steel, barbed tape, concertina, for barbed tape entanglements.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

QQ-S-781

QQ-W-428

QQ-W-461

- Strapping, Steel, and Seals.
- Wire, Steel, Carbon (High Carbon, Round for Mechanical Springs, General Purpose).
- Wire, Steel, Carbon, (Round, Bare and Coated).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: USA Belvoir Research, Development, and Engineering Center, ATTN: STRBE-TSE, Fort Belvoir, VA 22060-5606 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 5660

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

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MILITARY

MIL-T-704

- Treatment and Painting of Materiel.

STANDARDS

FEDERAL

FED-STD-595

- Colors.

MILITARY

MIL-STD-105

- Sampling Procedures and Tables for Inspection by Attributes.

MIL-STD-129

- Marking for Shipment and Storage.

MIL-STD-889

- Dissimilar Metals.

MIL-STD-1189

- Bar Code Symbolology Standard Department of Defense.

(Copies of specifications and standards required by contractors 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 documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DoDISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS shall be the issue of the non-Government documents which is current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM A 109 - Steel, Carbon, Cold-Rolled Strip.
- ASTM A 525 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- ASTM A 764 - Steel Wire, Carbon, Drawn Galvanized and Galvanized at Size for Mechanical Springs.
- ASTM B 117 - Salt Spray (Fog) Testing.
- ASTM D 522 - Elongation of Attached Organic Coatings with Conical Mandrel Apparatus.
- ASTM D 523 - Specular Gloss.
- ASTM D 2092 - Preparation of Zinc-Coated Steel Surfaces for Painting.
- ASTM D 3359 - Measuring Adhesion by Test Tape.

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

(Non-Government standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

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2.3 Order of 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. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Description. The barbed tape, concertina, shall consist of a coil of single-strand spring-steel line wire fitted with barbed tape as shown in figures 1, 2, and 3 and as specified herein. The collapsed coil shall be 38.0 inches ± 0.5 inch in diameter at the centerline, and shall consist of 55-4/5 spiral turns connected by steel clips so as to form a cylindrical diamond pattern when extended to a coil length of 50 feet. One end turn of the coil shall be fitted with four bundling wires for securing the coil when closed, and each turn shall be fitted with two steel carrying loops. The concertina shall extend to the required 50-foot length, and when placed back, coiled and laid flat, the coil shall have an overall height not to exceed 11 inches with no compression.

3.2 First article. Unless otherwise specified (see 6.2), a sample shall be subjected to first article inspection (see 4.3 and 6.3). Any changes or deviations of barbed tape from the approved first article during production will be subject to the approval of the contracting officer. Approval of the first article will not relieve the contractor of his obligation to furnish barbed tape conforming to this specification.

3.3 Material. Material shall be as specified herein. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification. Unless otherwise specified herein all equipment, material, and articles incorporated in the products covered by this specification shall be new. The end product shall be fabricated using recycled bulk materials to the maximum extent practicable without jeopardizing the intended use. The term "recycled bulk materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically authorized.

3.3.1 Steel strip.

3.3.1.1 Barbed tape. Cold-rolled steel for barbed tape shall conform to ASTM A 525, Rockwell hardness 15T, 80-85, uncoated thickness 0.020 inch, ± 0.003 inch. The barbed tape shall be galvanized in accordance with ASTM A 525, regular spangle, G90 coating designation. The barbed tape shall be phosphatized in accordance with commercially available phosphatizing processes for zinc phosphate conversion coatings and shall be compatible with galvanized surfaces. The treatment for conversion to zinc phosphate coatings shall be in accordance with ASTM D 2092. The minimum zinc phosphate coating weight shall be 150 mg/sq ft for spray processes and 300 mg/sq ft for immersion processes. Coat may be applied before all machining, brazing, forming, and perforating.

3.3.1.2 Clips. Clips shall be steel strip conforming to ASTM A 109, no. 1 temper, no. 1 finish, uncoated thickness 0.067 inch ± 0.003 inch, except that the

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hardness shall be Rockwell B 87-97. The clips or strips shall be phosphatized in accordance with commercially available phosphatizing processes for zinc phosphate conversion coatings. The treatment for conversion to zinc phosphate coatings shall be in accordance with ASTM D 2092. The minimum zinc phosphate coating weight shall be 150 mg/sq ft for spray processes and 300 mg/sq ft for immersion processes. Coatings may be applied when the steel is in strip or clip form.

3.3.1.3 Test specimens. Twelve test panels, 3 inches by 9 inches, made of the galvanized-phosphatized steel strips, prior to punching or forming, shall be painted, prior to painting the assembled barbed tape concertina, by the same process as used on the barbed tape concertina. Each painted test panel constitutes a test specimen.

3.3.2 Spring steel wire. Spring steel wire for line wire shall be 0.098 nominal inch diameter conforming to QQ-W-428, type I or type II, and shall be galvanized in accordance with ASTM A 764, finish 2, type 2 coating. The minimum tensile strength of 227,500 psi shall be maintained.

3.3.3 Steel wire.

3.3.3.1 Carrying loops. Steel wire for carrying loops shall be 0.135 inch nominal diameter and shall conform to QQ-W-461, steel no. 1010, finish 5, soft, class 1.

3.3.3.2 Bundling wire. Steel wire for bundling shall be 0.080 inch nominal diameter and shall conform to QQ-W-461, steel no. 1010, finish 5, soft, class 1.

3.3.4 Material deterioration prevention and control. The concertina tape shall be fabricated from compatible materials, inherently corrosion resistant or treated to provide protection against the various forms of corrosion and deterioration that may be encountered in any of the applicable operating and storage environments to which the concertina tape may be exposed.

3.3.4.1 Dissimilar metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion. Dissimilar metals and methods of protection are defined and detailed in MIL-STD-889.

3.3.4.2 Identification of materials and finishes. The contractor shall identify the specific material, material finish or treatment for use with component and subcomponent, and shall make information available upon request to the contracting officer or designated representative.

3.4 Fabrication.

3.4.1 Barbed wire. The single strand line wire together with clinched-on barbed tape shall constitute barbed wire. The barbed wire shall be preformed to fall naturally into coils and shall not show a wavy condition or form a figure eight. There shall be no spliced joints in the line wire. The two outer turns at each end coil shall be clipped together as shown in figure 2. The concertina

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coils shall be connected by clips approximately every 72 degrees on the circumference. Each turn shall be connected to the preceding turn by alternate clips and to the succeeding turn by the remaining clips.

3.4.2 Barbed tape. Barbed tape shall be fabricated with sharp barb configuration and dimensions as shown in figure 1.

3.4.2.1 Clinching barbed tape. The barbed tape (figure 1) shall be continuously clinched around the line wire as shown in figure 3. The barbed tape shall not disengage from the line wire when a force of 100 pounds is applied to the unsupported barb of a sample of concertina tape when tested as specified in 4.5.2.1. Unwelded butt joints in the tape are permissible provided the tape is aligned and butted and securely clinched to the line wire to withstand the 100-pound force when applied as specified herein. There shall be not more than three joints in a concertina.

3.4.3 Clips. The steel clips shall be formed as shown in figure 3 and, when clinched on the barbed wire, shall allow the coil to form the diamond-pattern mesh without permanent distortion of the barbed wire at the clips. The clips shall be clinched and shall prevent the barbed wire from pulling free. A clip shall allow axial rotation of the barbed wire yet not permit them to overlap diagonally. (A diagonal overlap would permit a barbed wire to cross over the other barbed wire allowing alignment with the clip gap, potentially allowing a barbed wire to work free of the clip.) The clip gap shall not exceed .062 inch at the narrowest distance between the overlapping ends of the clip. Envelopment or barb damage adjacent to the clips is permissible during clipping.

3.4.4 Bundling wire. The four bundling wires shall be permanently attached to one end turn of the concertina, one near each carrying loop, and two approximately 90 degrees from the carrying loops. The wire shall be wrapped once around the coil and both ends shall be securely twisted together leaving not less than 2 inches free for untying of the concertina.

3.4.5 Carrying loops. Two diametrically opposite carrying loops shall be attached to each end turn as shown in figure 3. The carrying loops shall provide a hand grasp area of at least 6 inches length by 3 inches width.

3.5 Painting.

3.5.1 Composition of the paint. The paint shall be epoxy water reducible type, satisfying the EPA requirements for maximum allowable volatile organic compounds. The paint shall contain 14.5 to 16.5 percent volume solids and 22.0 to 24.0 percent weight solids. The color shall be a visual match to field drab color number 30118, per FED-STD-595. A certificate of conformance to these requirements shall be obtained from the paint supplier for each lot of paint.

3.5.2 Painting procedures. The assembled barbed tape concertina and carrying loops shall be made free of oil, grease, dirt, and other foreign substances, in accordance with MIL-T-704, prior to being painted. The painting process to paint the assembled barbed tape concertina and carrying loops shall be optional provided the barbed tape concertina meets the requirements specified in 3.5.3.

3.5.3 Properties of the dried paint.

3.5.3.1 Coverage and film thickness. The barbed tape concertina shall be coated and no single exposed area shall be more than 0.1 inch transverse dimension. No more than two exposed areas shall exist per linear inch. The dried film thickness of the paint shall be 0.5 mills minimum when tested as specified in 4.5.2.3.

3.5.3.2 Spectral gloss. The test specimens when tested as specified in 4.5.2.2, the 60 degree spectral gloss shall not exceed 5.

3.5.3.3 Salt spray. When tested as specified in 4.5.2.6, the barbed tape concertina specimens shall show no blistering nor white corrosion or base metal corrosion products. The appearance of corrosion products visible to the unaided eye at normal reading distance shall be cause for rejection, except those white corrosion products at the edge of the specimens shall not constitute failure.

3.5.3.4 Flexibility. The test specimens when tested as specified in 4.5.2.4, the coatings shall show no evidence of cracking or peeling at the bend.

3.5.3.5 Cross hatch. The test specimens when tested as specified in 4.5.2.5, shall show no more than 5 percent removal of paint from the cross hatch area.

3.6 Workmanship. Wire used in the fabrication of the barbed tape concertina shall have no deformations of radius obviously smaller than the final coil radius of 18.75 inches. Shearing and forming shall be done neatly and accurately. Barbs shall be correctly formed and sharp. Bends for carrying loops shall be of uniform size and shape.

3.7 Identification tags. There shall be two identification tags, one attached to each end of the master bundle. Description and markings shall be as specified (see 5.3).

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.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the

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contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

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

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).
- c. Inspection of packaging (see 4.6).

4.3 First article inspection.

4.3.1 Examination. The barbed wire tape concertina and specimens of barbed tape and barbed wire shall be examined as specified in 4.5.1. Presence of one or more defects shall be cause for rejection.

4.3.2 Tests. The barbed tape concertina shall be tested as specified in 4.5.2. Failure of any test shall be cause for rejection.

4.4 Quality conformance inspection.

4.4.1 Sampling for examination and tests.

4.4.1.1 Barbed tape. Not less than two specimens of barbed tape shall be taken from each production machine by each operator. One specimen each shall be taken at the beginning and end of each day's/shift's production run.

4.4.1.2 Barbed wire. Not less than two specimens of barbed wire from each production machine by each operator shall be selected on a daily basis. One specimen each shall be taken at the beginning and end of each day's/shift's production run.

4.4.1.3 Barbed tape concertinas. Sampling of barbed tape concertinas shall be in accordance with MIL-STD-105.

4.4.2 Examination.

4.4.2.1 Barbed tape. Samples selected in accordance with 4.4.1.1 shall be examined as specified in 4.5.1.1. Presence of one or more defects shall be cause for rejection.

4.4.2.2 Barbed wire. Samples selected in accordance with 4.4.1.2 shall be examined as specified in 4.5.1.2. Presence of one or more defects shall be cause for rejection.

4.4.2.3 Barbed tape concertinas. Samples selected in accordance with 4.4.1.3 shall be examined as specified in 4.5.1.3. AQL shall be 2.5 percent defective for major defects and 6.5 percent defective for minor defects.

4.4.3 Tests.

4.4.3.1 Barbed wire. Samples selected in accordance with 4.4.1.2, shall be tested as specified in 4.5.2.1. Failure of the test shall be cause for rejection.

4.4.3.2 Test specimens. For each lot of paint, samples selected in accordance with 3.3.1.3 shall be tested as specified in 4.5.2.2 through 4.5.2.5 prior to painting the assembled barbed tape concertina. Failure of any test shall be cause for rejection.

4.4.3.3 Barbed tape concertina. Samples selected in accordance with 4.4.1.3 shall be tested as specified in 4.5.2.6. Failure of the test shall be cause for rejection.

4.5 Inspection procedure.

4.5.1 Examination.

4.5.1.1 Barbed tape. The barbed tape shall be examined as specified herein for the following defects:

101. Material not as specified.
102. Materials not resistant to corrosion and deterioration, or treated to be resistant to corrosion and deterioration for the applicable storage and operating environments.
103. Dissimilar metals as defined in MIL-STD-889 are not effectively insulated from each other.
104. Contractor does not have documentation available for identification of material, material finishes, or treatment.
105. Dimensions not as specified.
106. Barbs formed incorrectly (not sharp).
107. Zinc coating not as specified.

4.5.1.2 Barbed wire. The barbed wire shall be examined as specified herein for the following defects:

108. Material not as specified.
109. Materials not resistant to corrosion and deterioration, or treated to be resistant to corrosion and deterioration for the applicable storage and operating environments.
110. Dissimilar metals as defined in MIL-STD-889 are not effectively insulated from each other.
111. Contractor does not have documentation available for identification of material, material finishes, or treatment.
112. Dimensions not as specified.
113. Clinching not as specified.
114. Break in barbed tape.

4.5.1.3 Barbed tape concertinas. The barbed tape concertinas shall be examined as specified herein for the following defects:

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Major

- 115. Material not as specified.
- 116. Concertina diameter not as specified.
- 117. Presence of kinks, or lack of hourglass effects on the barbed wires at the clips.
- 118. Presence of a broken line wire.
- 119. Missing clips.
- 120. Color not as specified.
- 121. Treatment and painting not as specified.

Minor

- 201. Incorrect or missing carrying loops.
- 202. Number of spiral turns not as specified.
- 203. Incorrect or missing bundling wire.
- 204. Failure of concertina to be extended to 50 feet and return to lay with an overall height not to exceed 11 inches with no compression.
- 205. Clips not closed as per view A, figure 3, and shall not permit the wires to diagonally overlap within the clip through manual manipulation.

4.5.1.3.1 Painting. At the completion of the painting process the barbed tape concertina shall be examined prior to any handling which causes contact with other objects, without disturbing any of the coil loops, or altering the concertina geometry. Examination does not apply to bundling wire and carrying loops. Nonconformance to 3.5.3.1 shall constitute failure of this examination.

4.5.2 Tests.

4.5.2.1 Clinching. Place the sample of barbed tape clinched to line wire in a test fixture shown in figure 4. The sample shall extend four inches on each side of the test fixture. The load specified in figure 4 shall be applied to the unsupported barb at a speed of 0.25 inch per minute. Nonconformance to 3.4.2.1 shall constitute failure of this test.

4.5.2.2 Spectral gloss. Using two test specimens processed as specified in 3.3.1.3, test the spectral gloss in accordance with ASTM D 523. Nonconformance of either test specimen to 3.5.3.2 shall constitute failure of this test.

4.5.2.3 Dry film thickness. Using two test specimens processed as specified in 3.3.1.3, determine the dry film thickness with magnetic type or film thickness gauge at various spots on the test specimens, neglecting edges. Nonconformance to 3.5.3.1 shall constitute failure of this test.

4.5.2.4 Flexibility. Using two specimens processed as specified in 3.3.1.3, subject the specimens to the test specified in ASTM D 522, conical mandrel method. Nonconformance to 3.5.3.4 at diameters not more than 1/4 inch shall constitute failure of this test.

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4.5.2.5 Cross hatch. Using two specimens processed as specified in 3.3.1.3, subject the specimens to the test specified in ANSI/ASTM D 3359, method B, except change the space cuts to 0.1 inch apart and make all cuts about 2 inches long. Nonconformance to 3.5.3.5 of either test specimen shall constitute failure of this test.

4.5.2.6 Salt spray. Using a specimen not less than 6 inches long, taken from the barbed tape concertina, subject the specimen to continuous salt spray test in accordance with ASTM B 117, for not less than 120 hours. The inspection level shall be S-1 with an AQL of 2.5. Nonconformance to 3.5.3.3 shall constitute failure of this test.

4.6. Inspection of packaging.

4.6.1 First article pack. The first article pack shall be examined for the defects listed in 4.6.2.3. Presence of one or more defects shall be cause for rejection of the first article pack. Any deficiencies shall be corrected and the pack re-examined for conformance to this specification.

4.6.2 Quality conformance inspection.

4.6.2.1 Unit of product. For purpose of inspection, a complete bundle prepared for shipment shall be considered a unit of product.

4.6.2.2 Sampling. Sampling for examination shall be in accordance with MIL-STD-105.

4.6.2.3 Examination. Sample selected in accordance with 4.6.2.2 shall be examined for the following defects. The AQL shall be 1.0 percent defective.

- 122. Number of coils in bundle not as specified.
- 123. Strapping not of class, type, finish, and size specified.
- 124. Strapping not applied as specified.
- 125. Length and diameter of bundle not as specified.
- 126. Marking illegible, incorrect, or missing.

5. PACKAGING

5.1 First article. The contractor shall furnish a first article pack for examination within the time frame specified (see 6.2), to prove prior to starting production packaging, that the applied packing and marking comply with requirements of this specification. Examination shall be as specified in section 4 and shall be subject to surveillance and approval by the Government (see 6.4). The first article pack may be accomplished by utilizing either first article tape or production tape. When first article tape is utilized, and the Government requests a comparison between the first article tape and production tape, any packing shall be removed by the contractor at no expense to the Government.

5.2 Packing. Forty coils of concertina tape shall be compressed to form a compact bundle. The bundle shall be secured with four equally spaced straps conforming to QQ-S-781, class 2, type V, finish B, size 9. The secured bundle

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shall have an average maximum length of 41 inches when measured at the four points of strapping, and a maximum diameter at any location not exceeding 43.5 inches. The carrying loops on the coils at each end of the bundles shall be folded back against the coil and secured with soft annealed wire.

5.3 Markings. The bundled concertina tape shall be marked including bar coding in accordance with MIL-STD-129 and MIL-STD-1189. As a minimum, corrosion resistant metal tags, one at each end of the bundle, shall have the following information concerning item identification:

- a. NSN: 5660-00-921-5516
- b. Barbed Tape, Concertina MIL-B-52489E
- c. Quantity and unit of issue
- d. Contractor's name and CAGE code
- e. Contract number

The bar code marking shall be affixed to one side of each metal tag.

6. NOTES

6.1 Intended use. The barbed tape concertina is intended for military use as a tactical personnel obstacle.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. When a first article is required for inspection and approval (see 3.2 and 6.3).
- c. Time frame for submitting first article pack (see 5.1).

6.3 First article. When a first article inspection is required, the items should be a preproduction model. The first article should consist of one or more units. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, tests, and approval of the first article test results and disposition of the first article.

6.4 First article pack. Any changes or deviations of production packaging from the approved first article packaging will be subject to the approval of the contracting officer. Approval of the first article pack will not relieve the contractor of his obligation to pack and mark the barbed concertina tape in accordance with this specification.

6.5 Packing and marking. Only one method of packing and marking is acceptable regardless of end use or destination. Therefore, different levels of packing and marking are not applicable.

6.6 Dimensional limitation. The dimensional limitations specified in 5.1 are the maximum sizes allowable; however, bundles of lesser dimensions are acceptable when it has been determined that the additional strapping tension in nondetri-

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mental to the tape or the intended use of the tape. The contracting officer should consider the lesser cubage when evaluating bidder's proposed.

6.7 Subject term (key word) listing.

Barbed tape
Barbed wire
Concertina

6.8 Changes from previous issue. Asterisks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodian:
Army - ME

Preparing activity:
Army - ME

Review activity:
DLA - CA

Project 5660-0074

User activity:
Navy - YD

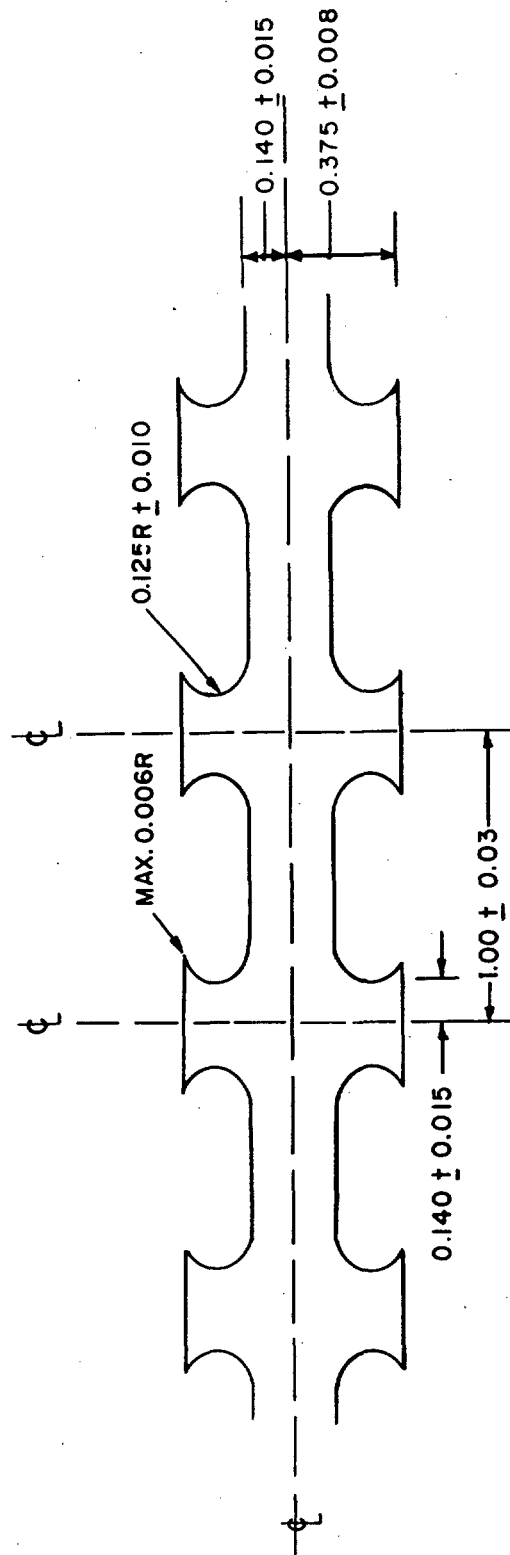


FIGURE 1. Configuration of barbed tape, prior to clinching to line wire.

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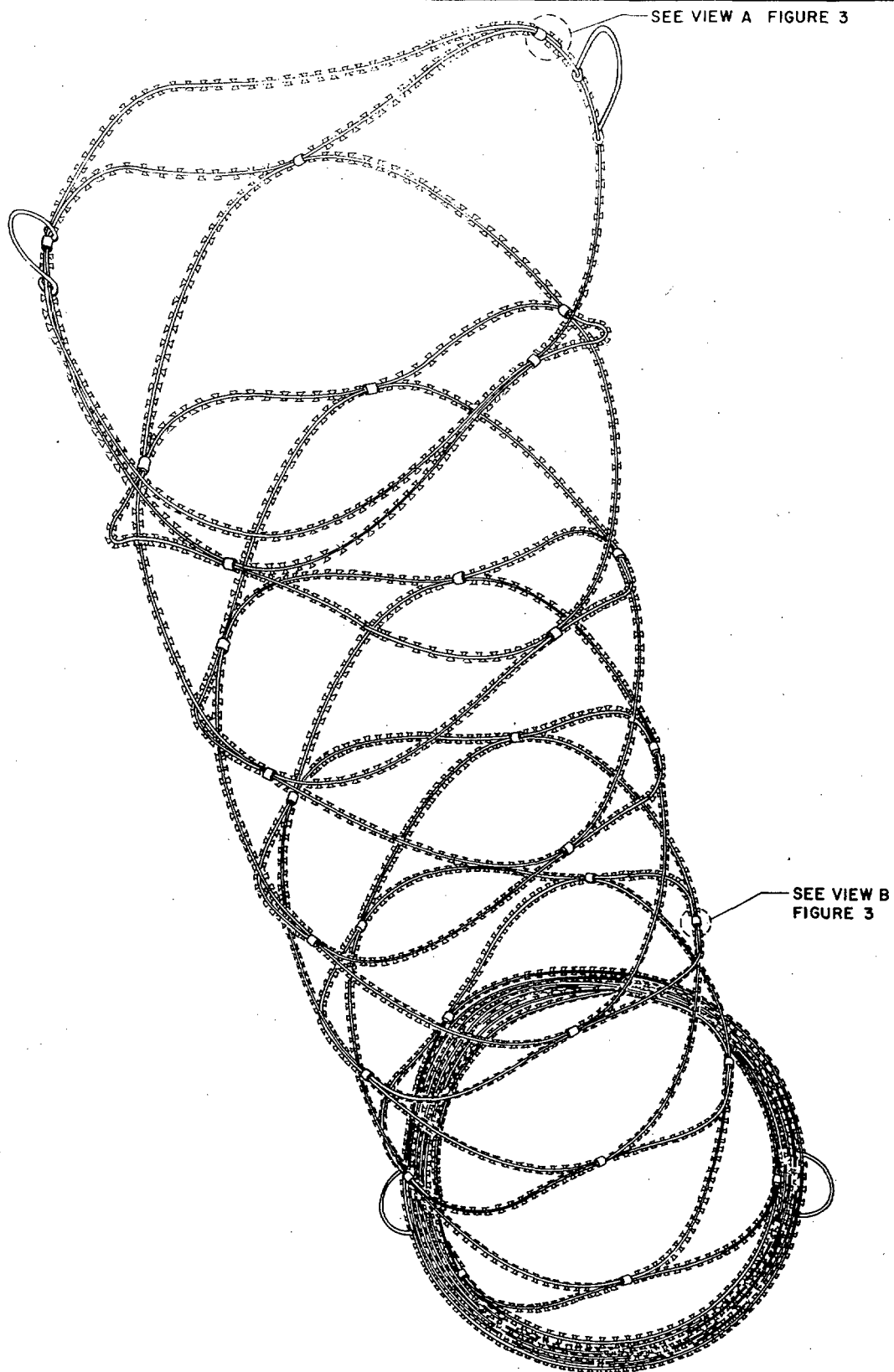
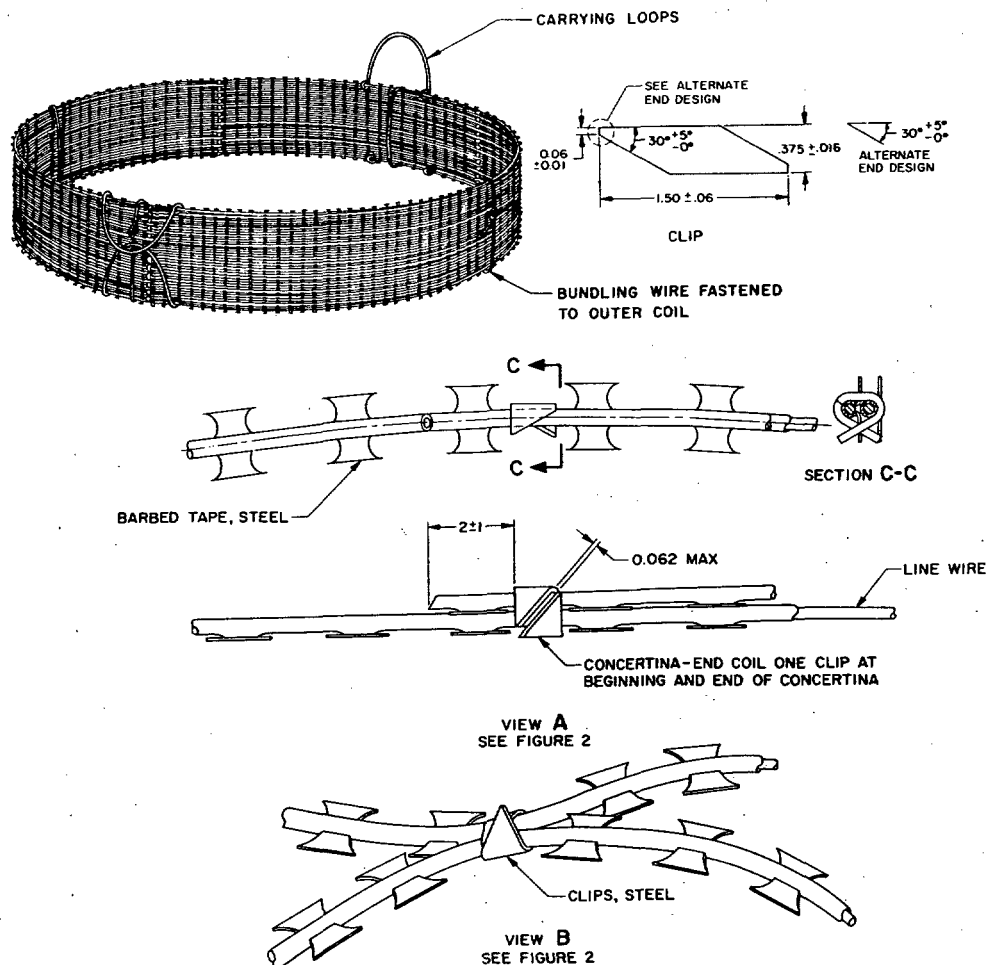


FIGURE 2. Barbed tape, concertina.

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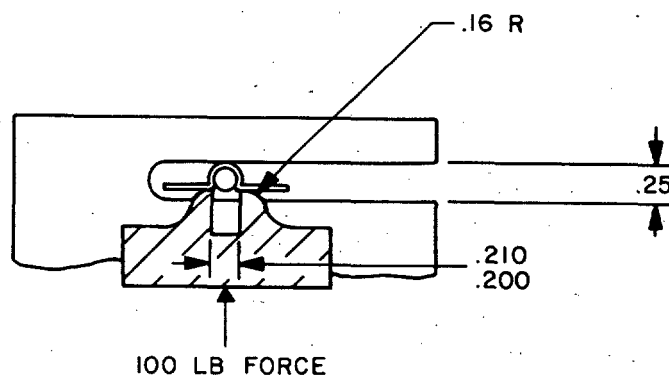
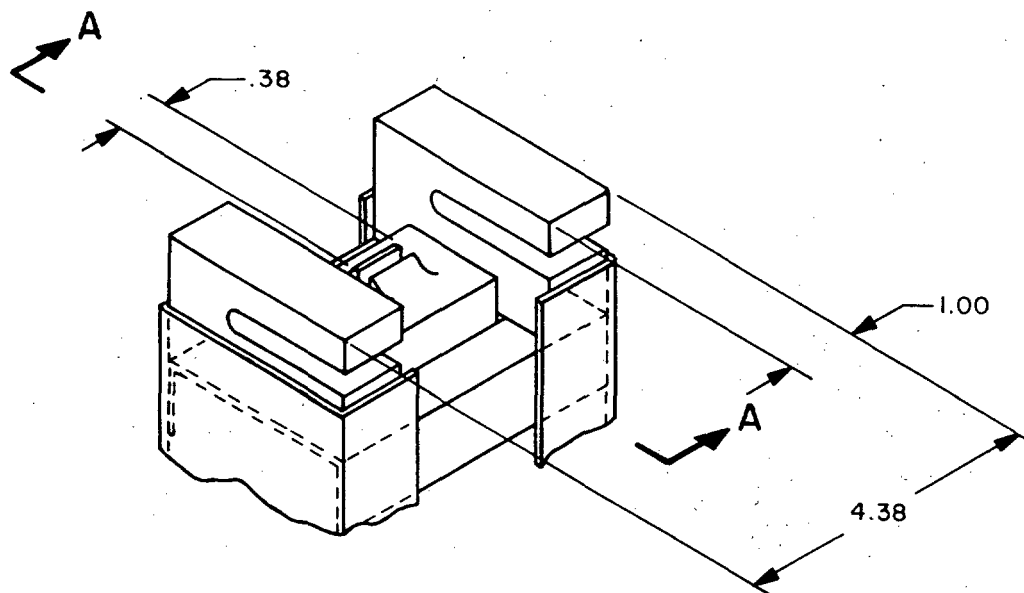


NOTES:

1. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES.
2. BARBED TAPE CLINCHED TO LINE WIRE, SHALL BE SYMMETRICAL ON LINE WIRE. TAPE OUTER EDGE TO CENTER ON 0.27 ± 0.05 INCH. A GO-NO-GO GAGE WITH THESE DIMENSIONAL TOLERANCES MAY BE UTILIZED. WIRE SHALL BE
3. UPPER FIGURE SHOWS CONCERTINA BEFORE COMPRESSION FOR SHIPMENT.

FIGURE 3. Barbed tape, concertina.

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SECTION A-A

NOTES:

I. UNLESS OTHERWISE SPECIFIED, TOLERANCES ARE $\pm .06$ INCHES.

FIGURE 4. Test fixture.

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[illegible]