

JJ-B-191a
March 1, 1967
SUPERSEDING
Fed. Spec. JJ-B-191
March 5, 1935

FEDERAL SPECIFICATION

BELTING, FLAT, CONVEYOR OR POWER TRANSMISSION, COTTON (SOLID WOVEN)

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers treated and untreated, solid woven, belting intended for use for conveyor or power transmission belting purposes.

1.1.1 Federal specification coverage. Federal specifications do not include all varieties of the commodity as indicated by the title of the specification, or which are commercially available, but are intended to cover only those generally used by the Federal Government.

1.2 Classification.

1.2.1 Types, classes, grades, and styles. Belting furnished under this specification shall be of the following types, classes, grades, and styles, as specified:

Type:

- I—Waterproof treated.
- II—Untreated.

Class:

- 1—2 ply.
- 2—3 ply.
- 3—4 ply.
- 4—5 ply.
- 5—6 ply.

Grade: (Applicable to type I only).

Grade (a)—Synthetic rubber or rubber impregnation.

Style 1—Black pigmentation.

Style 2—White pigmentation.

Grade (b)—Wax impregnation.

Grade (c)—Bituminous impregnation.

2. APPLICABLE DOCUMENTS

2.1 The following specifications and standards, of the issues in effect on the date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

Federal Specifications:

CCC-T-191—Textile Test Methods.

MMM-A-260—Adhesive, Water-Resistant. (For Sealing Waterproofed Paper).

FSC 3030

JJ-B-191a

- PPP-B-601—Boxes, Wood, Cleated-Plywood.
- PPP-B-621—Boxes, Wood, Nailed and Lock Corner.
- PPP-B-636—Box, Fiberboard.
- PPP-B-1055—Barrier Material, Waterproof, Flexible.
- PPP-C-650—Crates, Wood, Open and Covered.
- PPP-T-76—Tape, Pressure-Sensitive Adhesive Paper, (for Carton Sealing).

Federal Standards:

- Fed. Std. No. 123—Marking for Domestic Shipment (Civilian Agencies).
- Fed. Test Method Std. No. 406—Plastics: Methods of Testing.
- Fed. Test Method Std. No. 601—Rubber: Sampling and Testing.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, and Seattle, Wash.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specifications:

- MIL-C-104—Crates, Wood, Lumber, and Plywood Sheathed, Nailed and Bolted.
- MIL-C-3774—Crates, Wood; Open, 12,000 and 16,000 Pound Capacity.

Military Standard:

- MIL-STD-129—Marking for Shipment and Storage.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS**3.1 Materials.**

3.1.1 **Yarns.** The warp shall be No. 8's, 4 ply; the filling shall be not less than No. 8's, 6 ply; and the binder shall be not less than No. 8's, 3 ply. The yarn shall be made of thoroughly cleaned cotton free from waste.

3.2 Construction.

3.2.1 **Base belting.** The base belt shall be of solid woven cotton construction and shall conform to the requirements for the applicable classes in 1.2.1. Solid woven belting is a belting produced in the desired thickness and tensile strength, by weaving two or more plies of yarn into an innerbound unitized construction. A ply, an integral part of solid woven belting, consists of a single layer of interwoven warp and filling yarns.

3.2.2 **Thread count.** The number of threads per inch of belt width in the ply warp shall be not less than 32 ends per ply, and in the binder warp not less than 16 total ends per inch of belt width. There shall be not less than 10 filling threads (picks) per inch of belt length in each ply.

3.3 Dimensions.

3.3.1 **Length.** The belting shall be sufficiently longer than the minimum length specified (see 6.1), to permit removal of the sample for testing (see 4.2.3). The tolerance on the length shall be plus 1 minus 0 percent. An order for several belts may be filled from a single piece of belting of sufficient length to provide the several belts ordered plus the length required for test samples.

JJ-B-191a

3.3.2 Thickness. The finished thickness of the belt shall be determined by the number of ply specified (see 6.1). Each ply shall be 0.0420 inch thick with a tolerance of plus or minus 0.0015 inch.

3.3.3 Width. The width of the belt shall be as specified (see 6.1). The tolerance on the width shall be as specified in table 1.

Table I. Width tolerance

Width (inches)	Tolerance (inch)
1 to 6	+1/16
Over 6 to 12	+1/8
Over 12 to 18	+3/16
Over 18 to 24	+1/4
Over 24 to 36	+5/16
Over 36 to 60	+3/8
Over 60 to 100	+1/2

3.4 Physical properties.

3.4.1 Breaking strength. The breaking strength of the finished belt shall be not less than 250 pounds per inch, per ply. (See 4.4.2.)

3.4.2 Elongation. The percent of elongation shall be within the limits given in table II. (See 4.4.3.)

Table II. Elongation

Pounds tension per inch, per ply	Percent of Elongation					
	Type II		Type I			
	Maximum	Minimum	Grade A		Grade B	
			Maximum	Minimum	Maximum	Minimum
12	2.00	0.75	1.00	0.37	1.50	0.56
25	4.00	1.50	2.00	0.67	3.25	1.10
50	7.00	3.50	4.00	2.00	5.00	2.50
100	10.00	5.90	6.25	3.75	7.20	4.25
150	12.75	7.60	7.25	4.35	9.50	7.10
200	15.00	8.80	9.20	5.35	11.90	7.40
250	16.50	9.50	11.00	6.00	13.75	7.80

3.5 Type I.

3.5.1 Waterproof treatment. All type I belting shall be waterproofed with compounds that shall impregnate the entire thickness of the belt. The compounds shall allow permanent flexibility and shall remain intact within the belt. The compound shall not adhere to or soil or deface any material being conveyed nor the conveyor rollers or pulleys.

3.5.1.1 Treatments.

(a) Rubber impregnation—This treatment shall be made with quality compounds of synthetic elastomers such as neoprene and/or buna—N, natural rubber, or a combination of synthetic and natural rubber. Color of treatment shall be black or white, as specified (see 6.1).

(b) Wax impregnation—The belting shall be treated with clear or light amber waxes.

(c) Bituminous impregnation—The belting shall be treated with bituminous ingredients.

JJ-B-191a

3.5.2 Water absorption. The water absorption of the tested belting shall be not less than 3 nor more than 15 percent (see 4.4.4).

3.5.3 Deflection after accelerated aging test. The belting shall have a deflection of not less than 2 inches (see 4.4.5).

3.6 Fasteners. When specified (see 6.1), each belt shall be furnished with the necessary belt joint fasteners of the type approved by the purchaser.

3.7 Marking. The manufacturer's name or trademark, the type, and treatment designation of belting, and the last two digits of the year of manufacture shall be permanently attached to the belting on the wearing surface at intervals of not more than 50 feet.

3.8 Workmanship. The belting shall be free from defects which may impair its serviceability.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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 that supplies and services conform to prescribed requirements.

4.2 Sampling.

4.2.1 Lot. A lot shall consist of all belting of one type and class presented for delivery at one time.

4.2.2 Sampling for inspection. Unless otherwise specified (see 6.1), the sample for inspection shall be taken from the lot as described in table I of section 6 of Fed. Test Method Std. No. 601. For the purposes of inspection, a unit shall be one belt.

4.2.3 Sampling for test. Unless otherwise specified (see 6.1), the sample for test shall be taken from the lot as described in table III of this specification. For the purpose of tests, a unit shall be full width of belt, 20 inches long for belts over 16 inches in width, and 40 inches long for belts 16 inches and under in width.

Table III. Sampling for test

Lot size		Sample size Number of test units	Rejection Number
From Yards	To Yards		
0	500	1	1
501	1,000	2	1
1,001	2,000	3	1
2,001	3,500	4	1
3,501	5,000	5	1
5,001	7,000	6	1
7,001	10,000	7	1

4.3 Inspection. The belting shall be inspected for width (see 4.3.1), length (see 4.3.2), thickness (see 4.3.3), yarn number (see 4.3.4), thread count (see 4.3.5), number of plies, workmanship, and marking.

4.3.1 Width. The width of the belting shall be determined as described in method 2121 of Fed. Test Method Std. No. 601, at 50-foot intervals.

4.3.2 Length. The length of the belting shall be determined as described in method 2411 of Fed. Test Method Std. No. 601, using a tape graduated to 1/8 inch or less. As an alternate, a length recording device accurate to 1/8 inch may be used.

4.3.3 Thickness. The thickness of the belting shall be determined as described in method 2011 of Fed. Test Method Std. No. 601.

4.3.4 Yarn numbers. The yarn number shall be determined as described in method 4020 of CCC-T-191. For this examination the contractor shall furnish, in the required amount, yarn identical to that used in the manufacture of the belting.

4.3.5 Thread count. The thread count shall be determined as described in method 5050 of CCC-T-191.

4.4 Tests.

4.4.1 Standard conditions for tests. The specimens shall be conditioned in an atmosphere having a relative humidity of 65 ± 5 percent, and a temperature of $23 \pm 1^\circ\text{C}$. ($73.4 \pm 1.8^\circ\text{F}$.) for at least 18 hours previous to testing, except classes 4 and 5 which shall be held for at least 40 hours, and shall be tested under the same conditions.

4.4.2 Breaking strength. The breaking strength of the belting shall be determined as described in method 4111 of Fed. Test Method Std. No. 601, except that:

- (a) Each specimen shall be a portion of the test unit, the full thickness of the belt, cut by a die having the shape and dimensions shown in figure 1.
- (b) The grips which hold the specimen in the testing machine shall have transverse serrations on the surfaces contacting the specimen, and shall be as further described in method 4111. The rate of separation of the grips shall be 4 inches per minute, plus or minus 0.4 inch.
- (c) Three specimens shall be cut parallel to the longitudinal axis of the belting for determining breaking strength. The specimens shall be taken from test unit areas as widely separated as possible. The test report shall list the test results for each specimen and shall show the median value of the three specimens as the breaking strength of the test unit.
- (d) Specimens that break outside of the reduced section shall be discarded and replaced.

4.4.3 Elongation. The percent elongation shall be determined at the pounds per inch, per ply rating for each tension requirement in table II, by means of dividers or extensometer. The extensometer or dividers shall be fixed or held on the specimen with the points on the reference lines. Before starting elongation readings a nominal tension of 6 pounds per inch, per ply shall be applied to test specimens to eliminate natural creep.

- (a) Three specimens for the elongation test shall be taken from the test unit and conditioned for testing, as specified in 4.4.1.
- (b) The test report shall list the test result for each elongation reading on each specimen and shall show the median value for each reading for the three specimens as the elongation percent at the respective tension requirements.

4.4.4 Absorption. The absorption test is required for type I belting only. A weighed specimen of the finished treated belt 4 by 4 inches (see (a) following) with sealed cut edges shall be weighed and then immersed in water for 24 hours. After all free water has been removed from the surface of the specimen, it shall again be weighed. The increase in weight, in percent of water absorption, shall be determined based on the weight of the conditioned sample. The sealing of cut edges may be accomplished using a self-vulcanizing type of cement.

- (a) For absorption tests of belting four inches or less in width the test shall be conducted, as specified, using the full width of belting of the length specified above, and for widths of less than four inches, the specimen shall be of the additional length required to provide a surface area equivalent to that of the above specified size.

4.4.5 Accelerated aging test (see fig. 2). The accelerated aging test is required for type I belting only. A specimen 4 inches wide, plus or minus $\frac{1}{4}$ inch, with the long dimension parallel to the lengthwise direction of the belt, shall be cut at a distance of not less than 3 inches from either edge (exception is (a) following). It shall be free from seams and splices. The specimen shall be suspended in circulating air at

JJ-B-191a

a temperature of $100^{\circ} \pm 2^{\circ}$ C. ($212^{\circ} \pm 3.6^{\circ}$ F.), for a period of 14 days. At the end of this period, it shall be placed between two flat boards; sufficient weight shall be placed on the top board to hold the specimen parallel to the surfaces of the boards, and shall be maintained in this position for four hours. Reference marks are to be placed on the test piece at $\frac{1}{2}$, 9, and 10, inches $\pm \frac{1}{8}$ inch, respectively, from the same end of the specimen and at right angles to its long dimension. The specimen shall be again conditioned, as described in 4.4.1. It shall then be immediately clamped tightly at the 10-inch mark and supported on a $1 \pm \frac{1}{8}$ inch, diameter rod at the 9-inch mark. The clamps and rod shall extend across the full width of the test piece and its faces shall be horizontal within a tolerance of $\frac{1}{4}$ inch. A load of $1\frac{1}{2} \pm 1/16$ pound, shall be applied at the $\frac{1}{2}$ -inch mark uniformly across the width of the specimen for 5 minutes, and the vertical deflection of the end of the specimen shall be measured. The specimen shall be maintained at a temperature of $23^{\circ} \pm 1^{\circ}$ C. ($73.4^{\circ} \pm 1.8^{\circ}$ F.), from the time of its removal from the heated air until deflection is measured.

- (a) For accelerated aging tests on belting in widths of less than 10 but more than 4 inches, the 4-inch wide specimens shall be taken from the center of the test unit, equidistant from each edge. For belting four inches or less in width, the specimen shall be the full width of the belting and of the length specified above. The test shall be performed on specimens of less than four inches in width the same as specified for the 4-inch wide specimen, except that the weight attached at the $\frac{1}{2}$ inch reference line shall be directly proportional to the width of the specimen in the same ratio as the specified weight of $1\frac{1}{2}$ pounds for a 4-inch wide specimen.

4.4.6 **Blocking.** This method is designated for use in determining the degree of blocking or adhesion of the impregnating compound under specified conditions of temperature, humidity, and pressure. This method shall be in accordance with method 1131, Fed. Test Method Std. No. 406 but shall be adapted for type I conveyor belting as follows:

Use:

- (1) White bond envelopes instead of newsprint and specimens of conveyor belting of equal size.
- (2) The first sandwich combination in method 1121 only.
- (3) A 12-pound weight, 3 by 4 inches.
- (4) A temperature of $50^{\circ} \pm 1^{\circ}$ C. ($122^{\circ} \pm 1.8^{\circ}$ F.) for 24 hours.

4.5 **Inspection of preparation for delivery requirements.** An inspection shall be made to determine that packaging, packing, and marking comply with the requirements of section 5. Defects shall be scored in accordance with table IV. For examination of contents, the sample unit shall be one shipping container fully prepared for delivery selected just prior to the closing operations. Defects of closure listed shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be II and the AQL shall be 6.5 defects per hundred units.

Table IV. Classification of preparation for delivery defects

Examine	Defect
Markings (exterior and interior)	Omitted; incorrect; illegible; or improper size, location, sequence, or method of application.
Materials	Any component missing or damaged.
Workmanship	Inadequate application of components such as incomplete closure of container flaps, loose strapping, inadequate stapling. Bulging or distortion of container.

5. PREPARATION FOR DELIVERY

5.1. **Packaging.** Packaging shall be level A, B, or C, as specified (see 6.1).

JJ-B-191a

5.1.1 Level A. Rolls of belting in lengths as specified (see 6.1), with net weight not exceeding the weight limitations of the box specification shall be individually packaged in a close-fitting box conforming to PPP-B-636, class weather-resistant, style RSC. The box shall be closed in accordance with the box specification.

5.1.2 Level B. Rolls of belting in lengths as specified (see 6.1), with net weight not exceeding the weight limitations of the box specification shall be individually packaged in a close-fitting box conforming to PPP-B-636, class domestic, style RSC. The box shall be closed with two strips of tape conforming to PPP-T-76 along the top and bottom seams.

5.1.3 Level C. The belting shall be packaged in accordance with the supplier's commercial practice.

5.2. Packing. Packing shall be level A, B, or C, as specified (see 6.1).

5.2.1 Level A. Belting of like description packaged as specified in 5.1.1 shall be packed together; and belting in lengths as specified (see 6.1), with net weight exceeding 70 pounds, shall be individually packed in a close-fitting box conforming to PPP-B-601, type II, class 2 or PPP-B-621 class 2. The gross weight shall not exceed approximately 500 pounds. When the gross weight exceeds 250 pounds the box shall be provided with skids as described in the box specification. Belting exceeding 500 pounds shall be packed in a crate conforming to MIL-C-104, type I, class 1 or 2, style a. Strapping shall be in conformance with the requirements of the applicable box or crate specification.

5.2.2 Level B. Belting of like description packaged as specified in 5.1.2 shall be packed together; and belting in lengths as specified (see 6.1), with net weight exceeding 70 pounds, shall be individually packed in a close-fitting box conforming to PPP-B-601, domestic type or PPP-B-621, class 1. The gross weight shall not exceed approximately 500 pounds. When the gross weight exceeds 250 pounds, the box shall be provided with skids as described in the box specification. Belting exceeding 500 pounds shall be packed in a crate conforming to MIL-C-104, type I, class 1 or 2, style a. Type I belting, when applicable, may be packed in a crate conforming to PPP-C650 or MIL-C-3774. A shroud conforming to PPP-B-1055, class E-2 shall be provided. The shrouds shall hang free, if feasible, without the use of binding ties and shall extend approximately 6 inches off the bases of the crates. Seams shall be sealed with water-resistant adhesive conforming to MMM-A-260.

5.2.3 Level C. The belting shall be packed to insure carrier acceptance and safe delivery to destination in containers complying with the rules and regulations applicable to the mode of transportation.

5.3 Marking.

5.3.1 Civil agencies. In addition to markings required by the contract or order, the packages and shipping containers shall be marked in accordance with Fed. Std. No. 123.

5.3.2 Military agencies. In addition to markings required by the contract or order, the packages and shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents.

- (a) Title, number, and data of this specification.
- (b) Type, class, grade, and style of belting (see 1.2.1).
- (c) Width and length of belting (see 3.3.1 and 3.3.3).
- (d) Fasteners, if required (see 3.6).
- (e) Sampling for inspection, if different (see 4.2.2).
- (f) Sampling for test, if different (see 4.2.3).
- (g) Levels of packaging and packing required (see 5.1 and 5.2).
- (h) Special marking, if required (see 5.3).

JJ-B-191a

6.2. Departmental requirements. Requirements applicable to the Post Office Department:

- (a) When specified, a light oil finish (white) belting shall be furnished and water absorption for this belting determined as described in 3.5.2 and 4.4.4.

MILITARY INTEREST:

Custodians:

Army--MO

Navy--YD

Air Force--79

Preparing activity:

PO--ORE

CIVIL AGENCY INTEREST:

General Services Administration--FSS

Department of Commerce--BPR

Post Office Department--ORE

DOD coordination has been waived.

JJ-B-191a

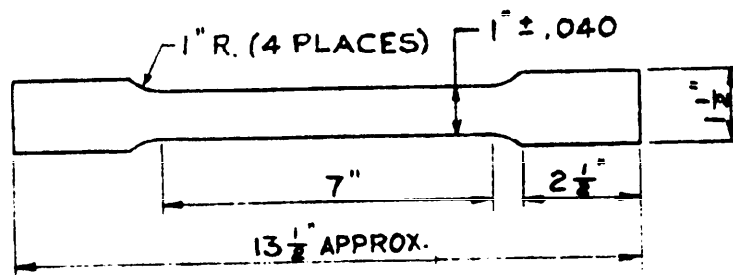


Figure 1

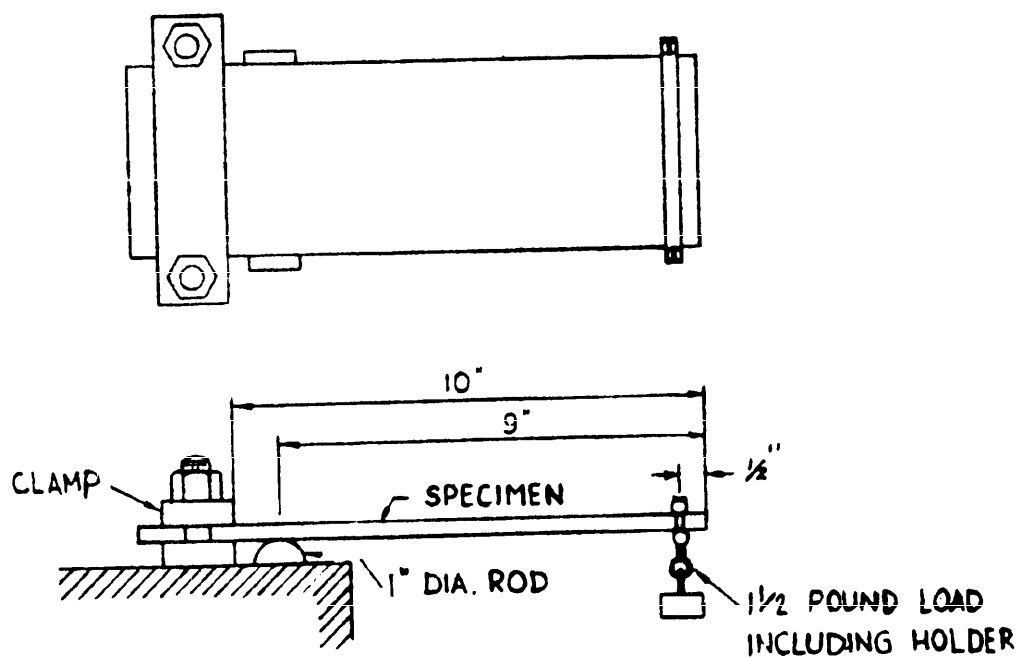


Figure 2

U. S. Government Printing Office: 1967

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein. Price 10 cents each.