

WW-P-404D

February 1, 1973

SUPERSEDING

Fed. Spec. WW-P-404C

August 2, 1961

## FEDERAL SPECIFICATION

PIPE, STEEL, (SEAMLESS AND WELDED, BLACK  
AND ZINC-COATED (GALVANIZED))

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 seamless and welded, black and zinc-coated (galvanized) steel pipe for flanging, bending, and coiling.

1.2 Classification. Steel pipe covered by this specification shall be furnished in the following types, grades, and classes, as specified (see 6.2):

## Type S - Seamless

## Grade A

- Class A53A S - Standard weight.
- Class A53A SXS - Extra strong.
- Class A53A SXXS - Double extra strong.

## Grade B

- Class A53B S - Standard weight.
- Class A53B SXS - Extra strong.
- Class A53B SXXS - Double extra strong.

## Type E - Electric-resistance

## Grade A

- Class A53A ERW - Standard weight.
- Class A53A ERWXS - Extra strong.
- Class A53A ERWXXS - Double extra strong.

## Grade B

- Class A53B ERW - Standard weight.
- Class A53B ERWXS - Extra strong.
- Class A53B ERWXXS - Double extra strong.

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Type F - Furnace butt-welded  
Class A53 BW - Standard weight.  
Class A53 BWXS - Extra strong.  
Class A53 BWXKS - Double extra strong.

## 2. APPLICABLE DOCUMENTS

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

### Federal Standards:

Fed. Std. No. 123 - Marking for Domestic Shipment (Civil Agencies).  
Fed. Std. No. 183 - Continuous Identification Marking of Iron and Steel Products.

(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, DC 20402.

(Single copies of this specification and other Federal specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, WA.

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

### Military Standards:

MIL-STD-129 - Marking for shipment and storage.  
MIL-STD-163 - Preparation of Steel Products for Domestic Shipment (Storage) and Overseas Shipment.

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

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2.2 Other publications. The following documents form a part of the specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM):

- A53 - Welded and Seamless Steel Pipe.
- A90 - Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
- A120 - Black and Hot-dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses.

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

National Bureau of Standards (NBS) Handbook:

- H28 - Screw-Thread Standards for Federal Services.

(Application for copies should be addressed to the Superintendent of Documents Government Printing Office, Washington, DC 20402.)

National Motor Freight Traffic Association, Inc. Agent:

- National Motor Freight Classification.

(Application for copies should be addressed to the American Trucking Association, Inc., Traffic Order Section, 1616 P Street, N.W., Washington, DC 20036.)

Uniform Classification Committee, Agent:

- Uniform Freight Classification.

(Application for copies should be addressed to the Uniform Classification Committee, Room 106, 222 South Riverside Plaza, Chicago, IL 60606.)

Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.

### 3. REQUIREMENTS

3.1 Materials. Pipe shall be plain carbon steel produced by any process that meets the requirements of ASTM A53. Pipe may be seamless, electric-resistance welded, furnace butt-welded, or lap-welded.

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3.2 Tensile requirements. Pipe shall conform to the requirements specified in table 2 of ASTM A53.

3.3 Hydrostatic pressure. Each length of plain-end pipe shall withstand the hydrostatic pressure prescribed in table A2 of ASTM A53, and each threaded-and-coupled length shall be hydrostatically tested as prescribed in table A3 of ASTM A53.

3.4 Flattening. Standard weight and extra-strong pipe, 2-1/2 inches and larger, shall be capable of withstanding the flattening test specified without showing evidence of lamination, or burnt material during the entire flattening process. No cracks or breaks in the metal and no opening in the weld shall occur in the flattening. The flattening test is not required for wall thickness over extra strong.

3.5 Bending. Pipe 2 inches or smaller shall be capable of withstanding the bend test without developing cracks of any proportion and without opening of the weld. Double extra-strong pipe over 1-1/4 inch in diameter need not be subjected to the bend test.

3.6 Dimensions. The dimensions of standard weight, extra strong, and double extra-strong pipe shall be as shown in table A2 of ASTM A53 for the size specified (see 6.2). The dimensions for threaded-and-coupled pipe shall be as shown in table A3 of ASTM A53.

3.6.1 Tolerances. The pipe dimensions shall not vary from the tolerances specified in sections 14 and 15 of ASTM A53.

3.7 Black and zinc-coated pipe. All pipe shall be furnished black or mill finish, unless zinc-coated pipe is specified (see 6.2).

3.8 Zinc-coating. The zinc-coating shall be applied by the hot-dip process, shall be bright in appearance, smooth, continuous, and substantially free from blisters, lumps, gritty areas, acid spots, dross, warts, flux, and excessing. The weight of the zinc coating shall conform to the requirements of ASTM A53. When specified (see 6.2), the molten zinc bath shall contain not more than 2 percent of elements other than zinc, as determined from samples selected at a point half the depth of the bath. The zinc coating shall be applied to pipe before threading.

3.8.1 Zinc-coated couplings. Unless otherwise specified (see 6.2), couplings for zinc-coated pipe shall be hot-dip coated on the outside.

3.9 Pipe threads. Threads for pipe and couplings shall conform to NBS H28.

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### 3.10 Pipe ends and couplings.

3.10.1 Standard weight. Standard weight pipe shall be furnished either with plain ends and without couplings or be threaded at both ends and have a coupling screwed on one end, as specified (see 6.2). The coupling shall be screwed on sufficiently tight and shall require a wrench for loosening (handling tight). Couplings on 2-1/2 inch and larger size pipe shall be NPT taper-threaded. Unless otherwise specified (see 6.2), couplings on 2-inch and smaller size pipe shall have NPT straight threads. Couplings for sizes 8-, 10-, 12-inch are recessed. Couplings shall be made of wrought steel of a quality equivalent to the material from which the pipe is made. Zinc-coated couplings shall be furnished with zinc-coated pipe.

3.10.2 Thread protection. Threaded pipe sized 4 inches and larger shall have metal thread protectors on the ends not protected by couplings. Threaded pipe of sizes smaller than 4 inches may be furnished without thread protection, except when rail-and-water or export shipments are involved, in which case these sizes shall be protected by rings of suitable metallic or non-metallic material. When sizes 1-1/2 inches or smaller are bundled, the ends of the pipe, or the entire bundle may be wrapped in burlap in lieu of the ring protector.

3.10.3 Extra-strong and double extra-strong pipe shall be without couplings and furnished with plain ends beveled for welding.

3.10.4 When plain-end pipe beveled for welding is specified (see 6.2), the bevel shall be 30 to 40 degrees on the outside, with a width of flat at the end of the pipe of  $1/16 + 1/32$  inch. The angle of the bevel shall be measured from a line perpendicular to the longitudinal axis of the pipe.

3.11 Identification marking. Each length of pipe shall be legibly marked by rolling, stamping, or stenciling in accordance with Fed. Std. No. 183. The marking shall include the producer's name or registered trademark, ASTM A53, and include the physical condition designator, and length. For small diameter pipe, this information may be marked on a tag securely attached to each bundle.

3.12 Workmanship. All pipe shall be commercially round, straight, of uniform quality, and cut at right angles to the axis of the pipe. All burrs shall be removed. Black pipe shall be substantially free from rust. Welded pipe shall have a sound weld along the entire length of pipe. The zinc-coating shall be free of injurious defects or

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excessive roughness. Butt-welded pipe shall be free of laminations, blisters, burrs, and interior obstruction. Electric resistance-welded pipe shall be free of injurious electrode burrs, objectionable rolled-in flash and commercially free from protruding flash.

#### 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.

4.1.1 Warehouse procurement. When specified (see 6.2), pipe furnished from a supplier's warehouse (whether the supplier is a manufacturer or a jobber) shall be submitted with evidence showing that the pipe has been manufactured in accordance with ASTM A53. Such evidence shall include the identification marking outlined in 3.11 and certified copies of the manufacturer's inspection records of the examination and tests made on the pipe being submitted for acceptance approval. The inspection requirements, together with all the tests outlined in ASTM A53, shall apply only to the manufacturer, providing the manufacturer's inspection records clearly indicate compliance with the provisions of this specification.

#### 4.2 Lot.

4.2.1 Examination. For purposes of examination, a lot shall consist of all pipe of the same type, grade, size, and class offered for delivery at one time.

4.2.2 Mechanical and zinc-coating tests. For purposes of mechanical testing and of determination of zinc-coating, a lot shall consist of not more than 500 lengths of pipe of the same type, grade, size, and class offered for delivery at one time.

#### 4.3 Sampling.

4.3.1 Sampling for examination and mechanical tests. One sample length of pipe shall be selected from each lot for examination (see 4.4) and flattening, bending, and tension tests specified under 4.5.

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4.3.2 Sampling for zinc-coating. One sample length of pipe shall be selected from each lot and shall be tested in accordance with 4.5.5.

4.4 Examination. Each sample length of pipe selected in accordance with 4.3.1 shall be rolled on suitable supports, its entire surface carefully examined, and the interior examined for obstructions and other defects. Each sample length of pipe shall be measured and weighed or otherwise examined as necessary to verify conformity with all requirements which do not involve tests.

#### 4.5 Test procedures.

4.5.1 Hydrostatic pressure test. Hydrostatic tests shall be made to show compliance with 3.3, and in accordance with section 9 of ASTM A53. While under pressure welded pipe 2-inch size and larger, shall be jarred near one end. Pipe showing any kind of defect in this test shall be rejected. For seamless and electric-resistance welded pipe, the hydrostatic pressure shall be maintained for not less than 5 seconds.

4.5.2 Flattening test. The flattening test shall be made on a test specimen cut from each end of each length of pipe selected in accordance with 4.3.1. The test shall be performed in accordance with section 8 of ASTM A53.

4.5.3 Bend test. The bend test shall be made on each sample length of pipe selected in accordance with 4.3.1. The test shall be performed in accordance with section 7 of ASTM A53.

4.5.4 Tension test. Each sample length of pipe selected in accordance with 4.3.1 shall be tested to determine conformance with 3.2. The test shall be in accordance with section 6 of ASTM A53.

4.5.5 Test for zinc-coating. The weight of the zinc-coating shall be determined by the method specified in sections 15 through 18 of ASTM A90. Both the minimum weight and the average coating weight of each sample length of pipe shall conform to the requirements of ASTM A120. If the result of the coating test for any lot does not conform to the requirements of 3.8, retests shall be made with two additional lengths of pipe from the same lot. Both retests shall meet the requirements of 3.8 or the lot shall be rejected.

4.6 Inspection of preparation for delivery. The preservation, packaging, packing, and marking of the pipe shall be examined to determine compliance with the requirements of section 5 of this specification.

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## 5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or C as specified (see 6.2).

5.1.1 Level A. The pipe shall be preserved and packaged in accordance with the applicable requirements of MIL-STD-163.

5.1.2 Level C. The pipe shall be cleaned, preserved, and packaged in a manner that will afford protection against corrosion, deterioration, or physical damage incurred during shipment from the supply sources to the first receiving activity. The supplier may rely on his own practice provided that it fulfills these requirements.

5.2 Packing. Packing shall be level A, B, or C as specified (see 6.2).

5.2.1 Level A or B. The pipe shall be packed in accordance with the applicable requirements of MIL-STD-163.

5.2.2 Level C. The pipe shall be packed in a manner that will insure arrival at destination in satisfactory condition and be acceptable at lowest rates to the carrier. Containers and packing shall comply with Uniform Freight Classification rules or National Motor Freight Classification rules.

5.3 Marking. In addition to any special marking required by the contract or order, the pipe shall be marked in accordance with Fed. Std. No. 123 or MIL-STD-129, as applicable (see 6.2).

## 6. NOTES

6.1 Intended use. Pipe covered by this specification is intended for use: (1) where coiling, bending, and flanging operations are involved; (2) with fresh water, oil, steam, air, and gases on shore; and (3) for shipboard use as overflow and sounding tubes, vents, air intakes, and hangar deck sprinkling systems.

6.1.1 Grade B steel pipe is not intended for close coiling, cold bending, or forge welding. Although grade A pipe is preferred for use involving cold bending, the bending of grade B pipe is not prohibited.

6.1.2 Butt-welded pipe is not intended for flanging.

6.2 Ordering data. Purchasers should exercise any desired options offered herein and procurement documents should specify the following:

(a) Title, number, and date of this specification.



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- (b) Type, grade, and class of pipe required (see 1.2).
- (c) Size of pipe required (see 3.6).
- (d) When zinc-coated pipe is required (see 3.7).
- (e) When samples of molten-zinc must be selected at a point half the depth of the bath to show that impurities do not exceed 2 percent (see 3.8).
- (f) When zinc-coated couplings are required (see 3.8.1).
- (g) When coupling is not required for threaded pipe (see 3.10.1).
- (h) Type of thread required (see 3.10.1).
- (i) When plain-end pipe beveled for welding is required (see 3.10.4).
- (j) If certification evidence is required for warehouse procurement (see 4.1.1).
- (k) Level of preservation and packaging and level of packing required (see 5.1 and 5.2).
- (l) Marking required (see 5.3).

6.3 Pipe should be ordered in terms of the number of feet required. In the case of pipe furnished with couplings, the length includes the coupling screwed on the pipe, wrench-tight (handling tight).

**MILITARY CUSTODIANS:**

Army - ME  
Navy - YD  
Air Force - 82

**Preparing activity:**

Navy - YD

**User activities:**

Army - CE  
Navy - MC, SH, CG

**Civil Agency Coordinating Activities:**

Commerce - NBS  
HEW - FEC  
USDA - AFS

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Orders for this publication are to be placed with the 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 15 cents each.