

DD-M-411C
January 2, 1990
SUPERSEDING
Int. Fed. Spec.
DD-M-00411b(GSA-FSS)
April 5, 1968 and
Fed. Spec. DD-M-411
October 2, 1948

FEDERAL SPECIFICATION

MIRRORS, GLASS

This specification is 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 commercial item description covers wood and metal framed wall mirrors of plate glass.

1.2 Classification. The mirrors shall be of the following classes and styles as specified (see 6.2):

Classes

- 1 - Wood frame
- 2 - Metal frame

Styles

- A - Light oak finish
- B - Walnut finish
- C - Chromium finished steel
- D - Anodized aluminum
- E - Stainless steel

Grades

- 1 - Type 302 or 304 stainless steel
- 2 - Type 430 stainless steel

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

FSC 7105

DD-M-411C

2 APPLICABLE DOCUMENTS

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

Federal Specifications:

- PPP-B-601 - Boxes, Wood, Cleated-plywood.
- PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
- PPP-B-636 - Boxes, Shipping fiberboard.

Federal Standards:

- Fed. Std. No. 123 - Marking for Shipment (Civil Agencies).

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions as outlined under General Information in the Index of Federal Specifications, Standards, and Commercial Item Descriptions. The Index which includes bimonthly 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 and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston, MA; New York, NY; Philadelphia, PA; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Houston, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Seattle, WA.

(Federal Government activities may obtain copies of Federal standardization documents and the Index of Federal Specifications, Standards, Commercial Item Descriptions from established distribution points in their agencies.)

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.

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.)

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

American National Standards Institute, Inc (ANSI) Standards:

ANSI/HPMA HP - Hardwood Plywood
ANSI/AHA A 135.4 - Hardboard

(Application for copies should be addressed to the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018).

American Society for Testing and Materials (ASTM) Standards:

ASTM A 525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process.
ASTM C 1036 - Flat Glass.

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

3 REQUIREMENTS

3.1 First article. First article testing shall be in accordance with the solicitation.

3.2 Material.

3.2.1 Mirror glass. The glass shall be type I, class 1, quality q^{L1} or q^{L2} conforming to ASTM C 1036. Outside dimensions of the glass shall be 18 X 30 inches, with a +/- tolerance of 1/16 inch. Thickness designation shall be 6.0 mm (5.56 to 6.2 mm or 0.219 to 0.244 inch).

3.2.2 Beveled edge. When specified, mirrors shall be furnished with beveled edges not less than 1 nor more than 1-1/4 inches wide. For framed mirrors, the outer edge of the bevel shall be 1/8 +/- 1/32 inch.

3.3.2 Wood.

3.3.2.1 Plywood. The plywood shall not be less than 3 ply. Construction shall be in accordance with ANSI/HPMA HP, Grade - 2, Type II, Construction - 4, thickness - not less than 3/16 inch thick. Both sides shall be sanded (S2S). Veneer core shall not be less than Grade - 3 and any voids shall be filled.

DD-M-411C

3.3.2.2 Solid wood. The wood frame for class 1 mirrors shall be kiln dried. Wood shall be free of defects. Sound tight knots of not over 1/4 inch maximum diameter will be acceptable if they are not in clusters. Figured grain or discoloration of the wood will be permitted provided a uniform color is obtained on the finished frame. The species of wood for the color of the finish specified shall be as shown in table I.

TABLE I. Species of wood and color of finish

Color of finish	Species	
Light Oak	Oak	Mahogany*
Walnut	Walnut	Maple
	Beech	Pecan
	Birch	Gum
	Cherry	Poplar

* Swietenia (Tropical American) and Khaya (African)

3.3.2.3 Hardboard. Hardboard shall be in accordance with ANSI/AHA A 135.4, Class 3, service tempered, Surface S1S, Thickness 3/16 inch.

3.4.3 Metal.

3.4.3.1 Aluminum. The aluminum frame of the style D mirrors shall be anodized. Unless a bright finish is specified, the finish shall be a natural satin.

3.4.3.2 Chrome plated steel. Unless otherwise specified, the chrome plating for style C mirrors shall be class 1 (decorative plating) and type II (satin) of QQ-C-320.

3.4.3.3 Stainless steel. Unless otherwise specified, the finish will be satin.

3.4.3.4 Steel. Sheet steel shall have an effective rust resistant finish.

3.4.3.5 Galvanized steel. When galvanized steel is used for backs, the weight of the coating shall conform to the requirements for triple and single spot minimum checks prescribed in the latest edition of ASTM A 525 for class 1.25, commercial.

3.5 Adhesive. The adhesive joint shall conform to a room temperature block shear test of 2800 p.s.i. minimum average and a 50 percent wood failure minimum average.

3.6 Glass silvering. The glass specified in 3.2.1 shall be coated on one surface with silver, and may be protected by a metallic copper film. These shall be protected by a suitable organic coating. The coating requirements shall be as follows:

3.6.1 Silvering. Silvering shall be a coating of chemically deposited silver. It shall be free of defects or blemishes in the reflecting surface such as lifting or separation of the silver from the glass, sulfide or other spots haze or any other visible defects.

3.6.2 Salt apray test. The mirrors shall pass a salt apray test as follows: Test specimens shall be cut from the corners of the mirror glass. The specimens shall be 9 by 9 inches +/- 1/2 inch. The soecimens shall be placed in a salt spray cabinet with the coated side up at an angle of 60 degrees + 5 degrees to the horizontal. The specimen shall be subjected to 300 hours of continuous salt spray in accordance with ASTM B 117 using a 20 percent solution of sodium chloride. Intermediate viewing and examination of the specimens will be permitted provided they do not remain out of the salt spray for more than three cycles totaling no more three hours which shall not be included in the 300 hour test period. At the end of the test, mirror specimens shall be removed, rinsed with clear water and dried to a watermark and salt free condition prior to examination. The latter shall be made from the face of the mirror using bright overhead lighting with the mirror in the horizontal position.

3.6.2.1 Viewing distance. The viewing distance shall be approximately 18 inches with normal vision (20/20 corrected or uncorrected) so that illumination and viewing angles are opposing at approximately 45 degrees. Illumination shall aproximate two 40 watt daylight or white fluorescent tubes at a distance of 4 to 5 feet. The mirrors shall be examined for evidence of any of the following which shall constitute failure of the test:

- a. Any clouding or darkening of the reflective surface.
- b. Any undercutting, discoloration, blackening, or silver impairment of the mirrors on any of the four edges greater than 1/8 inch measured from the edges. This applies to both cut and original (painted) edges.

DD-M-411C

- c. Any tarnish, spotting, or silver impairment greater than a total of 9 spots on the specimen and larger in size than specified below. The presence of 3 spots 3.0mm. or less in diameter is acceptable as is the presence of 6 spots 0.5 mm. or less in diameter is acceptable.

3.6.2.2 Blemishes. Blemishes caused by handling of the specimens during the test shall be excluded. Prior blemishes shall be included in rating the specimens.

3.7 Construction. Mirrors shall consist of a frame, glass, back, and metal hangers.

3.7.1 Class 1, styles A and B.

3.7.1.1 Frames. Frames for class 1 mirrors shall be solid wood as specified in 3.1.2.2 and table I. Only one species of wood is allowed. The wood shall be 2 inches wide with a minimum thickness of 3/4 inch. The width shall have a tolerance of +/- 1/16 inch. Each side of the frame shall be a single piece of wood and joined to pass the test in 3.6. The frame shall be slightly crowned. The mirror glass shall be held securely within the inside of the frame.

3.7.1.2 Backs. The backs shall be plywood or hardboard as specified. The tolerance for the backs shall be the same as the glass.

3.7.1.3 Hangers. Three rust resistant hangers shall be provided to permit wall hanging. The location of the hangers shall permit the mirror to be hung with either the long or short side at the top.

3.7.2 Class 2, styles C, D, and E.

3.7.2.1 Frames. The metal shall meet the requirements of 3.4.3.1, 3.4.3.2 or 3.4.3.3. The frames shall be either angles or channels. The width of the face of the frame shall not be less than 5/16 inch and the depth shall not be less than 1/2 inch. The corners shall be either square or rounded with a maximum of 1-1/2 inch corner radius. Joints shall be secured by a properly designed brace. Open miters shall not have any gaps. The mirror shall be cushioned and held securely within the inside of the frame.

3.7.2.2 Backs. Backs shall be either galvanized or sheet steel not less than 22 (0.0299 inch) gage as specified in 3.3.2.1 and 3.3.2.3. The back shall fit inside of the frame. The back may be omitted if the back of the mirror is 1/2 inch from the wall.

3.7.2.3 Hangers. Hangers shall be concealed and securely spot welded to the back of the frame.

3.8 Wood finish.

3.8.1 Color. The finish color shall be either oak or walnut, in accordance with Federal Supply Service standard colors.

3.8.2 Finish. The wood and plywood finish shall be smooth and even without blisters, pits, wrinkles, runs, and tackiness.

3.9 Workmanship. The frames shall have smooth neat joints without gaps, proper fitting of the mirror into the frame, and the absence of sharp corners. There shall be no defects that affect the appearance or serviceability of the mirrors.

3.10 Regulatory requirements. The offerer/contractor is encouraged to use recovered materials in accordance with Public Law 94-580, as amended, to the maximum extent practicable.

4 QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. The contractor shall be responsible for the performance of all inspection and testing in fulfillment of all requirements specified herein. Unless otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities approved by the Government as suitable for the performance of inspections and tests required by this specification. The Government reserves the right to perform any or all of the inspections and/or tests set forth in this specification, as deemed necessary to provide assurance of supply conformance to prescribed requirements.

4.2 First article requirements. The first article requirements shall be in accordance with the solicitation.

DD-M-411C

4.3 Quality conformance inspection. A sample of the finished product shall be selected in accordance with paragraph 4.6 of this specification for quality conformance verification. The sample shall be examined to verify that the requirements referenced in sections 1 and 2 have been met. Any nonconformances with the above requirements shall be considered a defect. All defects found shall be classified as major/minor in accordance with paragraphs 4.4 and 4.5 of this specification.

4.4 Major defects. The following conditions of nonconformance with the stated requirements of the specification shall be considered as major defects which may potentially affect the safety, functionality, durability, usability, and life of the purchased item.

- Glass not in accordance with ASTM C1036
- Plywood not in accordance with ANSI/HPMA HP.
- Hardboard not in accordance with ANSI/AHA A 135.4.
- Not in accordance with the salt spray test, ASTM B 117.
- Wrong kind of metallic reflective coating.
- Organic coating of backs missing.
- Each side of wood frame not of solid one piece construction.
- Wood frames warped, chipped, or splintered.
- Plywood back delaminated.
- Hardboard has a hole in it.
- Glass cracked or broken.
- Glass not as specified.
- Blurred or distorted image in mirror.
- Silver lifted or separated.
- Mirror loose in frame.
- Wood or metal joints uneven.
- Identification marking missing.
- Dimensions not as specified.

4.5 Minor defects. Nonconformances listed below shall be considered as minor defects affecting the appearance of the finished item.

- Finish blistered, peeling, sags runs, tacky and orange peel.
- Wrong color of wood finish.
- Scratches, abrasions, chips, or nicks in the wood.
- Thin or no finish on the wood.
- Open grained wood not filled.
- Metallic coating is the wrong color, not uniform, stained, or wrong color.
- More than one species of wood used in the frame.
- Any characteristic wood defect except sound tight knots not over 1/4 inch in diameter.
- Mirror back loose in frame.

4.6 Sampling. The sampling plan shall be in accordance with MIL-STD-105 with an inspection level II, Acceptable Quality Level (AQL) of 6.5 percent defective for minor defects and an inspection level of S-2, AQL of 2.5 percent defective for major defects.

4.7 Examination for preparation for delivery. An examination shall be made to determine that packaging, packing, and marking comply with section 5 requirements. The inspection level shall be level S-4, with an AQL of 4.0 percent defective.

Component missing, damaged, or otherwise defective.

Inadequate application of components such as incomplete closure of container flaps, overwrap, strapping, sealing, and cushioning inadequate, improper or missing, closures improperly affixed, components improperly secured, inadequate stapling, bulging or distribution of containers.

Identification marking not in accordance with Fed. Std. No. 123.

5 PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A, B, or Commercial as specified (see 6.2).

5.1.1 Level A. Each mirror shall be completely wrapped with non-marring paper or 1 mil thick polyethylene or polyvinyl-chloride film. Six mirrors shall be packaged upright in a close-fitting box conforming to PPP-B-636, Grade V3c, style FOL. corrugated fiberboard pads of equal length and width as the mirror shall be inserted between each frame, in front of the first frame and behind the last frame. Each box shall be closed and waterproof sealed in accordance with the appendix to PPP-B-636. When staples are used to close the box, a corrugated fiberboard pad shall be placed between the frames and the flaps to prevent the staples coming in contact with the mirrors.

5.1.2 Level B. The mirrors shall be packaged as specified in 5.1.1, except the waterproofing shall not be required.

5.1.3 Commercial. The mirrors shall be packaged in accordance with the supplier's standard commercial practice. The completed package shall be designed to protect the item against damage during shipment, handling, and storage.

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

DD-M-411C

5.2.1 Level A. Mirrors of one class and style only, shall be packed upright in close-fitting nailed wood or plywood boxes conforming to PPP-B-601, overseas type; or PPP-B-621, class 2. The box shall be fitted with a waterproof and water-vapor resistant liner on the inside. Each box shall be closed and strapped in accordance with the appendix to the applicable box specification.

5.2.2 Level B. The cartoned mirrors shall be packed as specified in 5.2.1 except that waterproofing shall not be required.

5.2.3 Commercial. The cartoned mirrors shall be packed to conform to the Uniform Freight Classification and National Motor Freight Classification.

5.3 Marking.

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

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

5.3.3 Special markings. Arrows or other prominent marks shall indicate that the mirrors contained shall be shipped and stored in an on-edge position.

5.3.4 Precautionary markings. Both sides of each shipping container shall be stenciled or labeled with the following:

"FRAGILE - GLASS"
"HANDLE WITH CARE"

6 NOTES

6.1 Mirrors covered by this specification are intended for use in general offices, health centers, washrooms, etc.

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

DD-M-411C

- (a) Title, number and date of this specification.
- (b) Class, style, and grade (if style E) of mirrors (1.2.1).
- (c) If bright finish metal frames required (3.4.3.1 3.4.3.2, 3.4.3.3).
- (d) If beveled edge is required (3.2.2).
- (e) Applicable level of packaging and packing (5.1 and 5.2).

6.3 Supersession and cross reference data. Table II lists the classes and styles of this specification that corresponds with superseded specifications as shown.

TABLE II, Cross reference of specifications

DD-M-411	DD-M-00411A	DD-M-00411B	DD-M-411C
Class B	Class 1, Style A	Class 1, Style A	Class 1, Style A
Class C	Class 1, Style B	Class 1, Style B	Class 1, Style B
Class E	Class 2, Style C	Class 2, Style C	Class 2, Style C
-----	Class 2, Style D	Class 2, Style D	Class 2, Style D
-----	-----	Class 2, Style E	Class 2, Style E

6.4 The NSN's for the mirrors are:

Class	Style	Grade	NSN
2	E	1	7105-00-133-4846
1	A	-	7105-00-262-7173
1	B	-	7105-00-262-7174
2	E	1 or 2	7105-00-496-9866
1	Tan and Brown	-	7105-00-840-8896

MILITARY INTEREST:

PREPARING ACTIVITY

None: DoD has waived coordination on revisions and amendments to this Federal Specification until further notice.

GSA - FSS/FCNE