Designation: C 725 – 90 (Reapproved 2003)

Standard Specification for Semidense Mineral Fiber Siding[1]

This standard is issued under the fixed designation C 725; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers semidense mineral fiber siding (shingles, clapboards, and sheets) designed to provide protection for the weather-exposed sidewall surfaces of buildings. These sidings are nailable with or without prepunched holes.

1.2 The values stated in SI units are to be regarded as the standard. The values stated in parentheses are provided for information only.

1.3 The following precautionary caveat pertains only to the test method portion, Section 9, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

C 460 Terminology for Asbestos-Cement[2]

D 1037 Test Methods of Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials[3]

2.2 *Federal Standard:*

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)[4]

2.3 *Military Standard:*

MIL-STD-129 Marking for Shipment and Storage[4]

3. Classification

3.1 Semidense mineral fiber siding shall be one of the following types, as specified:

3.1.1 *Type I, Shingles*—Uniform thickness, rectangular in shape, and having wavy, random, thatched, straight or irregular butts. Shingles are limited to 1.22 m (48 in.) in maximum length and 0.41 m (16 in.) in maximum width. Shingles are applied in horizontal lapped courses. The specified width is generally less than the specified length.

3.1.2 *Type II, Clapboards*—Uniform thickness, rectangular in shape and in lengths from 1.24 m (49 in.) to 3.66 m (144 in.) and widths up to 0.41 m (16 in.). The clapboards are applied in horizontal lapped courses.

3.1.3 *Type III, Sheets*—Uniform thickness, rectangular in shape and usually in 1.22-m (48-in.) widths and 1.22 to 3.66-m (48 to 144-in.) lengths. The sheets are generally applied vertically to sheathed or unsheathed sidewalls.

TABLE 1 Physical Requirements

	Nominal Thickness		Flexural Strength		Deflection	
	in.	mm	lbf	N	in.	mm
Type I	⅜	9.5	40	178	0.10	2.54
Type II	⅜	9.5	75	334	0.12	3.05
Type III	⅜	9.5	75	334	0.12	3.05
	¼	6.4	50	222	0.10	2.54

4. Materials and Manufacture

4.1 Semidense mineral fiber sidings are composed of a combination of asbestos fibers, portland cement or portland blast-furnace slag cement and mineral fillers, with or without the addition of organic fibers, curing agents, water repellent substances, coatings, or pigments, formed under pressure and cured to meet the physical requirements of this specification.

5. Physical Properties

5.1 *Flexural Strength*—The average breaking load obtained by loading equally and simultaneously at both one-third points of the span shall not be less than as shown in Table 1.

5.2 *Deflection*—At the ultimate breaking load obtained by loading equally and simultaneously at both one-third points of the span shall not be less than as shown in Table 1.

5.3 *Water-Absorption Swelling*—The average thickness increase resulting from water absorption shall not exceed 2 %.

5.4 *Product Durability*—The product shall withstand six complete cycles of accelerated aging conducted in accordance with Section 120 of Test Methods D 1037, and exhibit no visible delamination. The average breaking load of the dried

[1] This specification is under the jurisdiction of ASTM Committee C17 on Fiber-Cement Products and is the direct responsibility of Subcommittee C17.03 on Asbestos-Cement Products.

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[2] Discontinued, and replaced by D 2946. See 2000 *Annual Book of ASTM Standards*, Vol 04.05.

[3] *Annual Book of ASTM Standards*, Vol 04.10.

[4] Available from Standardization Documents, Order Desk, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

TABLE 2 Nominal Dimensions

Type	Width		Length		Thickness (nominal)	
	in.	m	in.	m	in.	mm
I	8 to 16	0.20 to 0.41	24 to 48	0.61 to 1.22	⅜	9.5
II	6 to 16	0.15 to 0.41	49 to 144	1.24 to 3.66	⅜	9.5
III	48	1.22	48 to 144	1.22 to 3.66	⅜	9.5
	48	1.22	48 to 144	1.22 to 3.66	¼	6.4

test specimens after cycling shall not show a decrease in strength of more than 10 % when compared with the corresponding values obtained from tests made on companion control specimens tested in accordance with 5.1.

5.5 *Density*—The average density as measured in the dry state shall be not less than 800 kg/m^3(50 lb/ft^3).

5.6 Refer to Terminology C 460 for terminology.

6. Dimensions, Mass, and Permissible Variations

6.1 Siding covered by this specification shall conform to the dimensions prescribed in Table 2.

6.2 *Tolerances*—The permissible variation from the nominal width or length shall be 3.2 mm (±⅛ in.), and the minimum thickness shall be 7.5 mm (0.30 in.) for nominal ⅜-in. thick product and 6.1 mm (0.24 in.) for nominal ¼-in. thick product as measured after conditioning for a minimum of 24 h at 70 ± 3°F (21± 1.6°C) and 50 % relative humidity. The deviation from squareness shall not exceed 1.3 mm/m (1/64 in./ft) of width or length when measured with a feeler gage and 0.61-m (2-ft) metal carpenter's square.

7. Workmanship, Finish, and Appearance

7.1 *Workmanship*—The product shall be free of defects that will impair appearance, erection, or serviceability.

7.2 *Color and Finish*—The exposed surface of the siding may be smooth, granuled, or otherwise textured as specified. The natural color is a light tan or gray and the surface may be uncoated, factory primed, or prefinished, as specified.

7.3 *Holes for Nails and Fasteners*:

7.3.1 *Type I, Shingles*—Unless otherwise specified, shingles shall be furnished with nail holes so placed as to provide a minimum top lap of 25.4 mm (1 in.).

7.3.2 *Type II, Clapboards*—Unless otherwise specified, clapboards shall be supplied without nail holes. These products are nailable and intended to be applied to provide a minimum top lap of 25.4 mm (1 in.).

7.3.3 *Type III, Sheets*—Sheets are supplied without nail holes, and are normally applied vertically in accordance with accepted practices.

8. Nails

8.1 *Nail Materials*—All nails shall be of nonstaining, corrosion-resistant material.

8.2 *Type I Product*—The face nails for Type I shingles shall be furnished by the shingle manufacturer and have shanks sized to enter the nail holes where provided in the units. The nails shall be long enough to hold the siding units securely to a nailing base.

8.3 *Type II and Type III Products*—The nails used with Type II and Type III products shall be of sufficient length to provide a minimum 25.4-mm (1-in.) penetration into the studs when sheathing is used and a minimum 38-mm (1½-in.) penetration into the studs when sheathing is omitted.

9. Sampling and Test Procedures

9.1 *Sampling Frequency*—From each shipment or fraction thereof representing a product of the same type, a number of shingles, clapboards, or sheets shall be taken at random. Table 3 shows the number of units to be taken from shipments of various sizes.

9.2 *Flexural Strength and Deflection Tests*:

9.2.1 *Preparation of Test Specimens*—Cut a single specimen 150 ± 2 mm (6 ± 1/16 in.) in width and 300 ± 2 mm (12± 1/16 in.) in length from each unit. Cut the specimens in such a manner that the 300-mm (12-in.) dimension of each specimen is parallel to the long dimension for Types II and III. For Type I, cut one half of the specimens as above and cut one half at a right angle thereto, provided that the shingle size permits. Do not test cracked or otherwise damaged specimens, but provide substitute specimens.

9.2.1.1 **Warning—**When cutting asbestos-cement products minimize the dust that results. Prolonged or frequent breathing of significant airborne concentrations of silica or asbestos dust is hazardous. When such dusts are generated, effective measures shall be taken to prevent inhalation. Refer to approved techniques.[5]

9.2.2 *Procedure*—Dry each 150 × 300-mm (6 × 12-in.) specimen to constant mass in a ventilated oven at a temperature of 100 to 105°C, (212 to 220°F), and cool to room temperature in a desiccator. Record the dry mass of each cooled specimen. Determine the flexural strength of each specimen by placing the specimen on supports that cannot exert longitudinal constraint [rocker-type bearing edges, rollers, etc., with a 3.2-mm (⅛-in.) minimum and a 13-mm (½-in.) maximum radius] and applying the load at midspan through a similar edge bearing against the finished surface of the specimen. The test span shall be 254 ± 2 mm (10 ± 1/16 in.) and the load lines and supports shall be parallel. Mount a dial micrometer reading to 0.02 mm (0.001 in.), or an equally sensitive apparatus to bear on the specimen at midspan, to determine the deflection of the specimen at the center of the test span. Increase the load applied at a uniform rate such as will result in failure of the specimen in approximately 1 min. The error in the load reading shall not exceed 2 N (0.5 lbf). Record the deflection for each specimen at maximum load. Take the flexural strength as the ultimate load, in newtons (or pounds-force).

[5] Available from Asbestos Information Association, 1745 Jefferson Davis Highway, Crystal Square 4, Suite 509, Arlington, VA 2202.

TABLE 3 Sampling Schedule

Number of Shingles, Clapboards, or Sheets in Shipment	Number of Units Selected
500 and under	3
501 to 1 000	5
1 001 to 1 728	6
1 729 to 2 744	7
2 745 to 4 096	8
4 097 to 5 832	9
5 833 to 8 000	10
8 001 to 64 000	20
64 001 to 216 000	30
216 001 to 512 000	40
512 001 to 1 000 000	50

9.3 *Water Absorption Swelling*:

9.3.1 *Sample Preparation*—For swelling tests, prepare a set of specimens 305 by 305 mm (12 by 12 in.) with all four edges trimmed less than 12 in., all units shall be cut with the 12-in. dimension of each specimen parallel to the long dimension of the unit. The width dimension shall be that of the specimen for specimens less than 12 in. wide.

9.3.2 *Thickness Measurement for Swelling Test*—Measure the thickness of each test specimen by placing a smooth metal plate of uniform thickness and with dimensions approximately 0.4 by 101 by 101 mm (1⁄64 by 4 by 4 in.) against the finished, textured, or weather-exposed surface of the specimen. Using a micrometer caliper reading to 0.03 mm (0.001 in.), measure the overall thickness of metal plate and specimen at the approximate midpoint of each edge of the specimen and at least 12.7 mm (½ in.) from the edge of the specimen. Subtract the measured thickness of the metal plate from each measurement and average the four measurements to give the specimen thickness.

9.3.3 *Procedure*—Dry the specimens that are prepared in accordance with 10.3.1 for 24 ± 1 h at a temperature of 220 ± 5°F (104 ± 3°C). Measure the thickness of each specimen in accordance with 10.3.2. Submerge the specimens horizontally under 1 in. of water maintained at 70 ± 5°F (21 ± 3°C) for 24 h. Remove and blot off surface water, remeasure the thickness at the same locations on the specimen, and express the swelling as percentage of thickness increase based on the thickness after conditioning.

9.4 *Product Durability*—Repeat the preparation of a second set of test specimens in accordance with 10.2.1. Subject this set of test specimens to accelerated aging cycles in accordance with Test Methods D 1037. At the end of the cycling procedure, examine each specimen and record any visible evidence of swelling, checking or cracking. Test the samples for flexural strength in accordance with 10.2.2 and the requirements of 5.4.

9.5 *Density*—Weigh the dry specimens that have been used in the flexural strength test and submerge them for 24 ± ½ h in clean water at from 60 to 80°F (15.5 to 27°C). Then weigh each sample while submerged in water, and reweigh in air after blotting off surface water. The balances used for the weighings should be accurate to 0.5 %. Report the density as the average value for all specimens tested. Calculate the density for each specimen as follows:

$$\text{Wet mass in air, g} - \text{mass in water, g} = \text{volume, cm}^3 \quad (1)$$

$$\text{Density, lb/ft}^3 = (\text{dry mass, g/volume, cm}^3) \times 62.43 \quad (2)$$

10. Inspection and Certification

10.1 Inspection and certification of the material shall be as agreed upon by the purchaser and seller as part of the purchase contract.

11. Rejection and Rehearing

11.1 *Cause for Rejection*—If the sample fails to conform to any one of the requirements of this specification, a second sample from the same lot shall be prepared and tested. The results of the retest shall be averaged with the results of the original test to determine compliance with this specification.

11.2 *Retest*—Failure to conform to any one of the requirements of this specification, upon retest as prescribed above, shall constitute grounds for rejection. In case of rejection, the seller shall have the right to reinspect the rejected shipment and resubmit the lot after removal of the portion of the shipment not conforming to the specified requirements, provided this is done within 20 days after receipt of notice of the specific cause for rejection.

12. Packaging and Package Marking

12.1 *Commercial Units*—The commercial unit is one square for marketing the Type I shingles products. One square is sufficient material to cover 9.29 m^2 (100 ft^2) of wall area when applied according to accepted practices. The Type II clapboards and Type III sheets are usually marketed in units of 92.9 m^2 (1000 ft^2).

12.2 *Commercial Packaging*—The semidense mineral fiber siding shall be packaged in accordance with accepted commercial practice to assure acceptance by common carrier.

12.3 *Job Protection*—Packages of the product shall be stacked on supports that will keep it off the ground; level, flat, and shall be covered to provide protection from the weather until used. Inside dry storage is preferable.

SUPPLEMENTARY REQUIREMENTS

The following supplementary requirements shall apply when material is supplied under this specification for U.S. Government procurement.

S1. Packaging

S1.1 Unless otherwise specified in the contract, the material shall be packaged in accordance with the producer's standard practice which will be acceptable to the carrier at lowest rates. Containers and packing shall comply with Uniform Freight Classification Rules[6] or National Motor Freight Classification Rules.[7] Marking for shipment of such material shall be in accordance with Fed. Std. No. 123 for civil agencies and MIL-STD-129 for military agencies.

[6] Available from the Uniform Classification Commission, Room 1106, 222 S. Riverside Plaza, Chicago, IL 60606.

[7] Available from National Motor Freight Inc., 1616 P. St., NW, Washington, DC 20036.

S2. Responsibility for Inspection

S2.1 Unless otherwise specified in the contract or purchase order, the producer is responsible for the testing of all material to ensure compliance with the requirements specified herein. Except as otherwise specified in the contract or order, the producer may use his own or any other suitable facilities for the performance of the inspection and test requirements specified herein, unless disapproved by the purchaser. The purchaser shall have the right to perform any of the inspections and tests set forth in this specification where such inspections are deemed necessary to ensure that material conforms to prescribed requirements.