Designation: F 1312 – 90 (Reapproved 2002)

An American National Standard

Standard Specification for Brick, Insulating, High Temperature, Fire Clay[1]

This standard is issued under the fixed designation F 1312; 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 one type of thermal insulating brick for use as backup insulation for refractory furnace linings of boiler furnaces.

1.2 The values stated in inch-pound units are to be regarded as standard. The SI units in parentheses are for information purposes only and may be approximate.

2. Referenced Documents

2.1 *ASTM Standards:*

C 93 Test Methods for Cold Crushing Strength and Modulus of Rupture of Insulating Firebrick[2]

C 134 Test Methods for Size, Dimensional Measurements, and Bulk Density of Refractory Brick and Insulating Firebrick[3]

C 210 Test Method for Reheat Change of Insulating Firebrick[3]

2.2 *Federal Specifications:*

PPP-B-601 Boxes, Wood, Cleated-Plywood[4]

PPP-B-621 Boxes, Wood, Nailed and Lock Corner[4]

PPP-B-636 Box, Fireboard[4]

2.3 *Military Specification:*

MIL-L-10547 Liners, Case, and Sheet, Overwrap; Vaporproof or Waterproof, Flexible[4]

2.4 *Military Standards:*

MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes[4]

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

MIL-STD-147 Palletized Unit Load 40 Inch by 48 Inch 4-Way (Partial) Pallet Skids, Runners, or Pallet Type Base[4]

3. Ordering Information

3.1 Orders for material under this specification shall include the following information as necessary to describe the material adequately:

3.1.1 ASTM designation and year of issue,

3.1.2 Dimensions required (see 6.1), and

3.1.3 Optional requirements, if any (see S1 through S3).

4. Material and Manufacture

4.1 Bricks shall be composed of heat-resistant materials which have been burned or fired to produce the desired density, strength, and structure.

5. Physical and Mechanical Properties

5.1 The average bulk density shall not exceed 45.0 lb/ft^3 (720 kg/m^3) (see 9.2).

5.2 The modulus of rupture shall average not less than 100 psi (700 kPa) (see 9.3).

5.3 Bricks shall show an average reheat change of not more than 1 % when heated at 2450°F (1343°C) (see 9.4).

6. Dimensions and Permissible Variations

6.1 Insulating brick shall be furnished in the dimensions specified (see 3.1.2). Standard size brick shall be 9 by 4½ by 2½ in. (229 by 114 by 64 mm), 9 by 4½ by 2 in. (229 by 114 by 51 mm), or 9 by 4½ by 1¼ in. (229 by 114 by 32 mm), as specified.

6.2 Standard size brick shall not vary more than ±1⁄16 in. (2 mm) from specified dimensions of 2 in. (51 mm) or greater, nor more than ±1⁄32 in. (1 mm) from specified dimensions less than 2 in. (see 9.2).

6.3 For special shapes, no dimension shall vary more than 1⁄16 in. (2 mm) from the dimensions specified (see 9.2).

[1] This specification is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.07 on General Requirements.

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[2] Discontinued; See 1991 *Annual Book of ASTM Standards*, Vol 15.01.

[3] *Annual Book of ASTM Standards*, Vol 15.01.

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

7. Workmanship, Finish, and Appearance

7.1 Bricks shall be of homogeneous structure, free from cracks, laminations, segregations, void defects, or soft centers. All corners and edges shall be sufficiently strong to prevent excessive crumbling or chipping when handled or shipped.

8. Sampling

8.1 For purposes of sampling, an inspection lot for examination and tests shall consist of all material of the same size and shape offered for delivery at one time.

8.2 The sample unit for the tests of Section 9 shall be one brick.

8.3 The sample size (the number of sample units) for the tests of Section 9 shall be as specified in Table 1.

10. Inspection

10.1 Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements specified herein. Except as otherwise specified, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the purchaser. The purchaser reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to ensure that supplies and services conform to prescribed requirements.

11. Product Marking

11.1 Bricks shall be marked with the manufacturer's name or trademark by suitable indentation or stamping.

TABLE 1 Instructions for Testing

Characteristic	Specification Reference		Requirements Applicable to		Number Determinations per Unit	Results Reported as		Sample Size
	Requirement	Test Method	Individual Unit	Lot Average		Pass or Fail	Numerically to Nearest[A]	
Density	5.1	9.2	. . .	X	1	. . .	0.1 lb/ft^3	10
Modulus of rupture	5.2	9.3	. . .	X	1	. . .	psi	10
Reheat change	5.3	9.4	. . .	X	1	. . .	0.1%	3

[A] Test reports shall include all values on which average results are based.

9. Test Methods

9.1 *Testing of the End Item*—The end item shall be tested for the applicable characteristics as shown on Table 1 from each lot presented for examination for each size and shape of brick.

9.2 *Dimensions and Bulk Density*—Dimensions and bulk density shall be determined in accordance with the test method specified in Test Methods C 134.

9.3 *Modulus of Rupture*—The modulus of rupture shall be determined in accordance with the test method specified in Test Methods C 93.

9.4 *Reheat Change*—The reheat change shall be determined in accordance with Test Method C 210, except that the test specimens shall be maintained at a temperature of 2550°F (1343°C) for 24 h.

12. Packaging

12.1 Bricks shall be packed in containers which will ensure acceptance by common carrier and safe delivery to destination at the lowest applicable rate. Containers shall comply with commercial carrier regulations.

13. Keywords

13.1 brick; insulating brick; fire clay

SUPPLEMENTARY REQUIREMENTS

The following supplementary requirements shall apply only when specified in the contract or purchase order (see 3.1.3).

S1. Referenced Documents

S1.1 The following documents shall apply only when one or more of the requirements of S2 or S3 are specified in the contract or purchase order (see 3.1.3): Federal Specifications PPP-B-601, PPP-B-621, and PPP-B-636; Military Specification MIL-L-10547; and Military Standards MIL-STD-105, MIL-STD-129, and MIL-STD-147.

S2. Special Government Requirements

S2.1 *Examinations and Test Requirements:*

S2.1.1 Examination of end item for defects in appearance, workmanship, and dimensions. An examination shall be made in accordance with Tables S1-S4 to determine that the appearance, workmanship, and dimensions of the end item comply with the requirements of this specification.

S2.1.1.1 The sample unit shall be one brick.

S2.1.2 Examination of preparation for delivery. An examination shall be made in accordance with Table S2 and Table S4 to determine that the packing and markings comply with the requirements of Table S3 of this specification.