

DEPARTMENT OF COMMERCE

BUREAU OF STANDARDS

George K. Burgess, Director

CIRCULAR OF THE BUREAU OF STANDARDS, No. 344

[Issued August 10, 1927]

UNITED STATES GOVERNMENT MASTER SPECIFICATION FOR
TILE, HOLLOW, CLAY, FLOOR

FEDERAL SPECIFICATIONS BOARD SPECIFICATION No. 506

This specification was officially promulgated by the Federal Specifications Board on July 11, 1927, for the use of the department and independent establishments of the Government in the purchase of clay hollow floor tile.

[The latest date on which the technical requirements of this specification shall become mandatory for all departments and independent establishments of the Government is October 11, 1927. They may be put into effect, however, at any earlier date, after promulgation.]

CONTENTS

	Page
I. General specifications.....	1
II. Classes.....	1
III. Material and workmanship.....	2
IV. General requirements.....	2
V. Detail requirements.....	2
VI. Method of sampling and tests.....	3
1. Sampling.....	3
2. Tests.....	3
VII. Packing and marking of shipments.....	4
VIII. Notes.....	4

I. GENERAL SPECIFICATIONS

There are no general specifications applicable to this specification.

II. CLASSES

This specification is applicable to hollow units of burnt clay intended for load-bearing purposes in floors and which are classified as: M, medium; and S, soft.

As different types of clay are used in the manufacture of hollow tile, color can not be taken as indicative of classification.

III. MATERIAL AND WORKMANSHIP

Tile under this specification shall be of burnt surface clay, fire clay, shale, or admixtures thereof.

Tile shall be sound, well burnt, free from large drying or burning cracks, reasonably free from laminations, and without excessive warpings or variations of more than 3 per cent from the specified dimensions.

After the absorption test the tile shall show no evidence of disintegration.

IV. GENERAL REQUIREMENTS

WEIGHT.—Clay hollow floor tile shall have the following dry weights:

Flat arch

Depth of arch (inches)	Average weight per square foot of floor (pounds)
6.....	26
7.....	29
8.....	32
9.....	35
10.....	38
12.....	42
15.....	50

Segmental arch

Depth of arch (inches)	Average weight per square foot of floor (pounds)
6.....	30
8.....	36
10.....	40

Tile for use in combination hollow tile and concrete construction

Size of unit (inches)	Minimum number of cells	Standard weight
Thickness by width by length:		<i>Pounds</i>
4 by 12 by 12.....	3	16
6 by 12 by 12.....	3	22
6 by 12 by 12.....	4	25
8 by 12 by 12.....	4	30
10 by 12 by 12.....	4	35
12 by 12 by 12.....	4	40

A tolerance of not more than 5 per cent under will be allowed on the above standard weights and not more than 3 per cent over or under in dimensions.

V. DETAIL REQUIREMENTS

The tile shall meet the following absorption requirements and also, if specified by the purchasing officer, the following compressive-strength requirements. Unless otherwise specified in the request for bids, medium (M) tile shall be accepted in lieu of soft (S) tile.

Class	Absorption		Compressive strength on net area			
	Average of five	Individual maximum	End construction		Side construction	
			Average of five	Individual minimum	Average of five	Individual minimum
M.....	<i>Per cent</i> 16 or less.....	<i>Per cent</i> 19	<i>Lbs./in.²</i> 3,000 or more..	<i>Lbs./in.²</i> 2,000	<i>Lbs./in.²</i> 1,500 or more..	<i>Lbs./in.²</i> 1,000
S.....	16 to 25.....	28	2,000 or more..	1,400	1,000 or more..	700

Where end-construction tile are used on side, they should meet the requirements of that construction, and vice versa.

The net area shall be taken as the minimum area of solid material in any section of the unit taken in a direction perpendicular to that in which the load is applied.

VI. METHOD OF SAMPLING AND TESTS

1. SAMPLING.—A set of five representative tiles for test shall be taken at random from shipments not exceeding 100 tons, and additional sets of five for each 100 tons for larger shipments. Where a shipment contains tile from several sources, separate sets of samples shall be taken of the tile from each. Where sampled at the plant, one set shall be taken from each kiln or from each 100-ton lot for continuous kilns. Separate samples shall be taken of each size and design of tile included.

2. TESTS.—(a) *Absorption tests.*—The tile shall be dried to constant weight in an oven at a temperature between 212 and 220° F. and their separate dry weights taken. These dry weights shall be taken as the required dry weights of the tile.

The five tiles shall then be placed in soft, distilled, or rain water and boiled at least one hour, after which they shall remain immersed until they have cooled to room temperature. They shall then be removed from the water, allowed to drain for not more than one minute, have their surface water removed by wiping with a damp cloth, and be weighed separately. The increase in weight of the wet pieces, divided by the weight of the dry tile and multiplied by 100, shall be taken as the percentage absorption. The scale used shall be sensitive to within one-half of 1 per cent of the smallest piece weighed.

In cases where it is not convenient to dry or boil the whole tile two pieces from the shell and one from the webs of each tile may be used. Where the strength tests are made, the absorption determinations may be made on sound fragments from the broken tile. The rough or sharp edges of the pieces shall be rounded off. The size of the pieces shall be determined by the sensitivity of the scale used, but each shall weigh not less than 8 ounces (227 grams). The percentage

absorption shall then be obtained by the method given above for whole tile, the average absorption of the three pieces being taken as the absorption of the tile from which they were taken.

When pieces are used as above, the dry weight of the tile as required under Section IV shall be computed by multiplying the weight of the undried tile by the ratio the dry weight of the pieces bears to weight of the same pieces before drying.

Where means are not available for the boiling test, the absorption test may be made by immersing the dry tile or pieces in soft, distilled, or rain water at ordinary temperatures for five hours. When this method is used, the absorption limits for the different classes shall be reduced one-fourth below the values given in Section V for both the average and the individual maximums.

In cases of disagreement as to the resulting classification the absorption shall be determined by the boiling method and the full percentage absorption for the respective classes given in Section V applied. The same tile or pieces, redried to constant weight, may be used in any such retest.

(b) *Compression test.*—When the strength test is to be made, five additional representative tiles shall be selected and their bearing surfaces coated with shellac and made plane and parallel with a plastic capping consisting preferably of 3 parts (by volume) of Portland cement and 1 part of unretarded calcined gypsum (plaster of Paris), and aged three days or more before testing. Where the test must be made sooner, a neat unretarded calcined gypsum cap may be used and allowed to set one hour or more before testing. Where tile tested with neat gypsum caps fail to meet the specification requirements on the score of strength, they shall be retested with Portland cement-gypsum caps aged not less than three days. In testing, the tile shall be placed under a spherical bearing block of proper design and loaded in a testing machine in which the speed of the moving head is not more than 0.05 inch per minute. The maximum load divided by the net sectional area shall be reported as the strength of the tile.

VII. PACKING AND MARKING OF SHIPMENTS

VIII. NOTES

BASES OF ACCEPTANCE.—The requirements have been simplified to permit acceptance based on weight, absorption, material, and workmanship in cases where the tile is used under loads considerably below working-load values, which is frequently the case. These determinations can be made, if necessary, at the site of the work or at the plant with equipment that can be provided without much

difficulty. For more exacting use the compression tests should be made and acceptance based on their results in addition to those from the weight and absorption determinations, the standing of any set of samples being determined by the requirement which gives it the lowest classification.

ADDITIONAL COPIES

OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE

WASHINGTON, D. C.

AT

5 CENTS PER COPY

▽

