DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT FEDERAL HOUSING ADMINISTRATION	Series and Series No. USE OF MATERIALS BULLETIN NO. 17e Supersedes UM-17d
TO: AREA OFFICE DIRECTORS INSURING OFFICE DIRECTORS	Date July 17, 1974

SUBJECT: CONCRETE ROOFING TILE

Members of the HUD Staff processing cases and inspecting construction shall use this information in determining acceptability of the subject material for the uses indicated.

This bulletin should be filed with Bulletins on Special Methods of Construction and Materials as required by prescribed procedures. Additional copies may be requisitioned by the field offices.

GENERAL: This bulletin on concrete roofing tile includes production and field installation provisions. Licensed manufacturers have provided evidence of responsibility and capability to carry out factory quality controls and satisfactory roofing installations.

SIZES: Maximum overall width of any size, shape, or design of roofing tile shall be 15", and maximum overall length 24". Minimum thickness of any part of tile shall be 3/8".

MATERIALS: Concrete mix shall be 1:3 1/2 portland cement and dry sand. Water added shall not exceed 12% of sand weight. Coloring pigments shall be limeproof metallic oxides. A screw, pan or centrifugal type concrete mixer is used following which the mix is poured into the extruding machine which shapes the tile. Twenty-four hour moisture curing or 8 hour kiln cure is a minimum time required before the tile are stacked in the storage yard.

MANUFACTURE: Factory production of concrete roofing tile shall be carried out in strict compliance with the applicable specifications and instructions, including required quality controls.

Concrete tile shall meet or exceed the following laboratory tests to be made by a recognized testing laboratory after 28 day aging:

(1) Durability Tests: Resistance of tile to severe weather exposure shall be determined by freezing and thawing tests as described in ASTM-C-67, Method B.

Not less than 6 tile shall be selected at random either from yard stacks or from the tile at the job site.

Test specifications require 50 cycles of alternate freezing and thawing and also require that the tile tested shall show no breakage and not over 1% loss of dry weight.

(2) Transverse Strength Tests: Ability to carry normal roof traffic without significant damage to the roofing tile shall be determined by the results of transverse tests made on at least 6 tile selected at random from storage stacks or from job lots. Testing method and details shall include the sample tile positioned in place on their bearing ends the same as normal position in place on the roof. The concentrated load applied at midspan between supports 9" apart shall be carried to failure. Average breaking load shall be not less than 250 lbs. Details of method of test shall be specified by the testing laboratory and be in accordance with applicable standards.

*(3) Absorption Tests: Resistance to water penetration and moisture damage shall be determined by the following laboratory test:

Six sample tile, selected at random, shall be freed from loose particles by scrubbing with a fiber brush and clean water. The samples shall be dried in a well ventilated oven for 24 hours at a temperature of 105°C.(varying not more than 2°C). After drying, the samples shall be weighed. The samples may be cooled at room temperature for 15 minutes or desiccated before weighing. The weight of each sample shall be measured to the nearest 0.01 gram. The samples shall then be immersed entirely in filtered or distilled water for 48 hours at a temperature of 20°C. (varying not more than 5°C.). The samples shall be removed one at a time, the surfaces wiped dry, and weighed immediately to the nearest 0.01 gram. The absorption, calculated as a percentage of dry weight, shall not exceed 15 percent for any tile tested.

Revised 7/17/74

Field Installation:

1. Concrete roofing tile shall be installed over solid wood sheathing in localities where Weather Bureau records list average minimum temperatures in January below 15°F.

   On roof pitches of 4:12 or over, an underlayment of 30# roofing felt or better shall be provided over the solid wood sheathing. With roof pitch of less than 4:12 the tile are considered decorative only and shall have weather protection provided by a 3 ply built up roofing membrane applied over the solid sheathing.

   In warmer climate areas where freezing temperatures are seldom encountered inter-locking types of tile may be installed over wood stripping spaced not over 12" o.c. Stripping should be of minimum 1" x 4" size. Asphalt felt of 30# per square or better, lapped at all joints, shall be nailed over roof framing as an underlayment before nailing down the stripping.

2. Nailing requirements over solid wood sheathing.

   a. All smooth surfaced interlocking and non-interlocking flat tile with factory punched top end nail holes shall be secured to roof by not less than 2 annular ringed nails of galvanized metal, copper, or stainless steel. Length shall be ample to penetrate sheathing at least 3/4".

      Exposure to weather shall be as follows:

Shingle Length (inches)	Maximum Exposure (inches)
24	9 1/2
16	7
15	6 1/2
14	6
12	5

   b. Interlocking concrete tile shall have a sufficient number of holes prepunched to facilitate fastening at eaves, ridges and other parts of the roof where fastening is specified.

      On roof pitches under 4:12 all perimeter tile and every 4th tile in every 4th row shall be nailed same as flat non-interlocking tile.

Roof pitches of 4:12 to 7:12 shall have all perimeter tile and alternate tile in each course nailed down so that each nailed tile adjoins a tile not nailed.

On pitches of 7:12 to 12:12 nail down all perimeter tile and every 4th tile in every 4th row.

Roof pitches of 12:12 or over shall have all tile nailed in place, or secured by equivalent fastening.

On all roof pitches the starter course shall have top and bottom of all tile nailed in place, or secured by equivalent fastening.

c. Concrete tile installed over spaced sheathing or over-stripping shall use 8d nails for fastening. 9d or 10d nails shall be used for tile applied to solid sheathing.

Ridge and hip tiles may be fastened with 14 gage corrosion resistant wire laced through prepunched holes and anchored to nail heads which are not driven flush. As an alternate method for fastening, direct nailing is accomplished by use of 6" long or longer corrosion resistant nails.

Tile installed over metal framing shall be fastened with 14 gage corrosion resistant wire, self tapping screws, or suitable metal clips.

Metal Roofs

When solid wood sheathing is used, installation of concrete tile over aluminum, steel, or other metal roofs shall be the same as on wood frame roofs, except that fastening at eaves and ridges is accomplished by using corrosion resistant wire ties, or self tapping screws as specified by the manufacturer.

WARRANTY AND CERTIFICATION:

The manufacturer, or the accredited licensee, shall certify to the local HUD Insuring Office that the concrete roofing tile to be used on the listed property has been manufactured under prescribed quality controls, and in accordance with the applicable provisions of this Use of Materials Bulletin.

Certification shall include official copies of current laboratory test reports advising that samples of the tile to be used meet or exceed test requirements listed in this Use of Materials Bulletin.

The licensee or contractor shall guarantee the particular roofing tile installation against defective concrete tile, damage from weather, or other defects under normal service, and defects due to poor workmanship, for a period of one year after completion. Any faulty materials, improper installation, or defective workmanship, shall be corrected promptly at the expense of the roofing contractor, licensee, or manufacturer.

U. S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

H O U S I N G

NOTICE Unnumbered

7/16/79

TO: Regional Administrators, Directors, Offices of Regional Housing, Field Office Managers and Supervisors

SUBJECT: Use of Materials Bulletin No. 25d "Application and Fastening Schedule Power Driven, Mechanically Driven and Manually Driven Fasteners"

The subject bulletin is being considered for revision to include new fasteners and applications. It is estimated that the process will take one year to eighteen months.

In the interim, we have reviewed and accepted the request from the Industrial Stapling and Nailing Technical Association covering the changes to the Table XIV of the bulletin. These changes are in line with the model codes.

The revised Table XIV is attached.

Attachment

H:DISTRIBUTION: Code 026 - Tab 14, R-1, R-3-1(H), R-4, R-5

TABLE NO. XIV
FASTENING SCHEDULE FOR FRAMING

Item No.	FASTENER DESCRIPTION	CONNECTION DESCRIPTION	Fasteners Required	Minimum Fastener Length In Inches
1	.113 T-Nail	Joist to sill or girder, toe nail	3	
2	8d Cooler	Bridging to joist, toe nail each end	2	
3	8d Sinker	1"x6" subfloor or less to each joist, face nail	2	
4	8d Box	Wider than 1"x6" subfloor to each joist, face nail	3	
5	8d Common	Stud to sole plate, toe nail	4	
6	8d Screw Nail	Ceiling joists to plate, toe nail	3	2 3/8
7	8d Ring Nail	Continuous header to stud, toe nail	4	
8	14 Ga. Staple	Rafter to plate, toe nail	3	
		1" brace to each stud and plate, face nail	2	
		1"x8" sheathing or less to each bearing, face nail	2	
		Wider than 1"x8" sheathing to each bearing, face nail	3	
9	.131 T-Nail	2" subfloor to joist or girder, blind and face nail	2	
10	.131 to .135 Nail	Sole plate to joist or blocking, face nail	16" o.c.	
11	16d Sinker	Top plate to stud, end nail	2	
12	16d Box	Doubled studs, face nail	24" o.c.	
13	16d Common	Doubled top plates, face nail	16" o.c.	
14	16d Screw Nail	Top plates, laps and intersections, face nail	2	3
15	16d Ring Nail	Continuous header, two pieces	*16" o.c.	
16	14 Ga. Staple	Ceiling joists, laps over partititons, face nail	3	
		Ceiling joists, to parallel rafters, face nail	3	
		Built-up corner studs	24" o.c.	
		2" planks	2	

*See Footnote 3

TABLE NO. XIV
FASTENING SCHEDULE FOR FRAMING
(Continued)

Item No.	FASTENER DESCRIPTION	CONNECTION DESCRIPTION	Fasteners Required	Mini Faste Leng In Inch
Combination Subfloor-underlayment (to framing):				
17	6d Screw Nail	3/4" and less	SEE FOOT NOTES 1 & 2	2
18	6d Ring Nail			
19	14 Ga. Staple			
20	8d Screw Nail	7/8" to 1"		2 1/
21	8d Ring Nail			
22	14 Ga. Staple			
23	10d Common	1 1/8" to 1 1/4"		3
24	.148 T-Nail			
25	14 Ga. Staple			
26	8d Screw Nail			2 1/
27	8d. Ring Nail			

[1] Fasteners spaced 6 inches on center at edges, 10 inches at intermediate supports for floors and 12 inches on center for roofs.

[2] Fasteners spaced 6 inches on center at all supports where spans are 48 inches or more.

[3] Along each edge.