Table 3Required number of specimens

(see Clause 7.1.1.)

| Test | Clause | Number of specimens |
|---|------------------------------|---------------------|
| Physical tolerances | | |
| Tiles | 6.1.1 and 6.1.2 | 5 |
| Tiling accessories | 6.1.1(a)(i), (ii), and (iii) | 5 |
| Water absorption Tiles Tiling accessories | 6.2 6.2 | 5 3 |
| Water permeability — Tiles | 6.3 | 5 |
| Freezing and thawing — Tiles | 6.4 | 5 |
| Transverse strength — Tiles | 6.5 | 5 |

Note: The same specimens may be used for the tests for physical tolerances, water absorption, and water permeability.

7.1.2 Conditioning of samples

Testing shall be carried out by a testing laboratory that is accredited by an accredited certification organization as being in accordance with the requirements of CSA A283 or by a testing laboratory accredited by the Standards Council of Canada.

7.1.3 Surface preparation

Loose particles shall be removed from specimens by scrubbing with a fibre brush and tap water.

Where uncoated specimens are required by Clauses 7.3 or 7.4, tiles and tiling accessories that are sampled in accordance with Clause 5.1 shall be sampled before the coating process or shall be lightly sandblasted to remove the coating.

7.2 Fit at head lap

7.2.1 Test specimens

Five full-sized tiles shall be tested for dimensional requirements.

7.2.2 Test method

A template matching the nominal product specification shall be placed perpendicular to the upper surface of the tile and at right angles to the side. With a round 2.5 mm diameter gauge, the full contact area between the template and the upper surface of the tile shall be checked. Any area where space exceeds the thickness of the test gauge shall be reported. See Figure 4.

7.3 Water absorption

7.3.1 Test specimens

Five full-sized uncoated tiles and three full-sized uncoated tiling accessories shall be tested.

7.3.2 Accuracy of weighing equipment

The balance used shall be accurate to within 0.1% of the mass of the specimen tested.



Figure 4 Typical profile template (See Clause 7.2.2.)

7.3.3 Dry mass

Specimens shall be dried to constant mass in a ventilated oven at 110 ± 5 °C for not less than 24 h, and shall then be weighed separately. Constant mass shall be assumed when two consecutive readings, taken at least 2 h apart, agree within 0.2%.

Results shall be reported to the nearest 0.1% for each specimen.

7.3.4 Cooling

Before determining the saturated mass in accordance with Clause 7.3.5, specimens shall be cooled at a temperature of 21 ± 2 °C at 30 to 70% relative humidity for at least 4 h. Specimens warm to the touch shall not be used.

7.3.5 Saturated mass

After obtaining the dry mass of each of the specimens, they shall be immersed in potable water at a temperature of 21 ± 2 °C for 24 ± 1 h.

Specimens shall be removed from the water and allowed to drain for not more than 1 min. The superficial water shall then be removed from the specimens using a damp cloth, and their mass shall be determined. The mass of any one specimen shall be determined within 2 min of removal from the water.

Mass shall be reported to the nearest 0.1%.

7.3.6 Method of calculation

Water absorption shall be calculated as a percentage of the initial dry mass, rounded to the first decimal place. The results shall be reported separately for each specimen.

7.4 Water permeability

7.4.1 Test specimens

Five full-sized uncoated tiles shall be tested.

7.4.2 Test apparatus

Each tile shall be sealed around the edges into a suitable metal frame (see Figure 5), using putty or an equivalent material to ensure a watertight seal. The frame shall extend from below the underside of the tile to not less than 55 mm above the invert of the main watercourse. Care shall be taken that the inverts of the water channels are not covered by the sealant. Nail holes shall be sealed.

The tile supported in the frame shall be positioned horizontally. The supports shall not be in contact with the underside of the tile and shall be at a height sufficient to allow observation of the underside of the tile.

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Section AA

Figure 5 Sealing of tile in metal frame for permeability test (See Clause 7.4.2.)

7.4.3 Test method

A 50 mm head of water, measured from the invert of the main watercourse, shall be maintained on the tile for 24 h. If necessary, water shall be added during the test to maintain the 50 mm level.

7.5 Freezing and thawing

7.5.1 Test specimens

Five full-sized coated tiles shall be tested.

7.5.2 Applicable Standards

Tests shall be in accordance with ASTM C 67.

7.6 Transverse strength

7.6.1 Test specimens

Five full-sized tiles shall be tested after being dried in accordance with Clause 7.3.3.

7.6.2 Test method

Each specimen shall be supported horizontally, as shown in Figure 2, on two rigidly supported battens of SPF*, not less than 25 mm thick. The hanging faces of the batten lugs shall be placed against one 38 mm wide batten and the anticapillary ribs shall be placed on the 25 mm wide batten with the edge of the tile flush with the edge of the batten. A 50 mm² steel bar shall be placed at the mid-span of the specimen on felt 10 mm thick. A 10 mm diameter steel ball shall be seated in a cavity in the upper surface of the bar at the centre of the tile weathering face. The cavity shall have a radius of 5 mm and a depth of 2.5 mm.

The test load shall be applied vertical to the steel ball at a uniform rate not exceeding 14 N/s until the specimen fails. The test load at failure of each specimen shall be recorded. *Protrusions from the tile will bed into the spruce/pine/fir (SPF) and prevent point loading.

8 Identification

8.1 General

All concrete roof tiles and tiling accessories conforming to this Standard shall be identified in accordance with Clause 8.2.

8.2 Markings

8.2.1 Identification markings

The following markings shall be provided:

- (a) the name or logo of the manufacturer or plant;
- (b) the location of the plant;
- (c) the type or style name and colour of the tile or accessory as given by the manufacturer;
- (d) the date of manufacture or lot number or another mark from which this information can be ascertained;
- (e) the phrase "Meets CSA A220.0"*; and
- (f) the phrase "The colour of the surface coating on this product may change as a result of aging, weathering, and efflorescence".

*It is understood that the Canadian Standards Association has not participated in the inspection, testing, or certification of a product so marked. This is the manufacturer's indication that the product is manufactured to CSA A220.0. "CSA" should be in "func" font and should not be a reproduction of the CSA monogram or registered trademark.

8.2.2 Method of identification

The markings required by Clause 8.2.1 shall be on the packaging of the tiles and tiling accessories or on slips of paper inserted between tiles and tiling accessories in packages or on pallets.

At least one marking or slip of paper shall be used for each type of tile or tiling accessory on a pallet.

8.2.3 Durability and legibility

The markings required by Clause 8.2.1 shall be such that they are not made illegible by exposure to heat, light, moisture, or abrasion during normal handling and use.

8.3 Literature

All promotional and technical literature shall include the following statement: "The colour of all tiles and tiling accessories may change as a result of aging, weathering, and/or efflorescence; the change for surface coloured tiles and tiling accessories may be more pronounced."

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Published in December 2006 by Canadian Standards Association A not-for-profit private sector organization 5060 Spectrum Way, Suite 100, Mississauga, Ontario, Canada L4W 5N6 1-800-463-6727 • 416-747-4044

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A220.1-06 Installation of concrete roof tiles

1 Scope

1.1

This Standard applies to the installation of concrete roof tiles and tiling accessories on roofs with slopes of 1:3 and greater.

Note: Figures in this Standard are for illustration of specific clause requirements and do not include all details necessary for a proper roof installation. Manufacturers' installation guidance should be followed where not contradictory to the requirements of this Standard.

1.2

This Standard provides the minimum requirements for the installation of battens and underlayment materials under concrete roof tiles as well as the related requirements for weather-resistant roofing systems.

1.3

This Standard does not provide design requirements for truss, rafter, or roof strength.

1.4

In CSA Standards, "shall" is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; "should" is used to express a recommendation or that which is advised but not required; "may" is used to express an option or that which is permissible within the limits of the standard; and "can" is used to express possibility or capability. Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material. Notes to tables and figures are considered part of the table or figure and may be written as requirements. Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

2 Reference publications

This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below, including all amendments published thereto.

CSA (Canadian Standards Association)

A123.3-05 Asphalt saturated organic roofing felt

CAN/CSA-A179-04 Mortar and grout for unit masonry

A220.0-06 Performance of concrete roof tiles

B111-74 (R2003) Wire nails, spikes and staples

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O437 Series-93 (R2006) Standards on OSB and waferboard

O437.0 OSB and waferboard

ASTM International (American Society for Testing and Materials)

C 979-05 Standard Specification for Pigments for Integrally Colored Concrete

D 828-97 (2002)

Standard Test Method for Tensile Properties of Paper and Paperboard Using Constant-Rate-of-Elongation Apparatus

D 1204-02

Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature

E 96/E 96M-05 Standard Test Methods for Water Vapor Transmission of Materials

CGSB (Canadian General Standards Board)

19-GP-5M-1984 Sealing Compound, One Component, Acrylic Base, Solvent Curing

CAN/CGSB-19.13-M87 Sealing Compound, One-Component, Elastomeric, Chemical Curing

19-GP-14M-1984 Sealing Compound, One-Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing

CAN/CGSB-19.24-M90 Multicomponent, Chemical-Curing Sealing Compound

ICBO (International Conference of Building Officials)

[now known as ICC (International Code Council)] Acceptance Criteria for Concrete Tile Underlayment on Spaced Sheathing, ICBO Evaluation Service, 1989

NRCC (National Research Council Canada)

National Building Code of Canada, 2005

TAPPI (Technical Association for the Worldwide Pulp, Paper, and Converting Industry) T 803 om-06 *Puncture Test of Container Board*

3 Definitions

In addition to the terms defined in Clause 3 of CSA A220.0, the following definitions apply in this Standard:

Note: See Figure 1 of this Standard for an illustration of the terms defined in Clause 3 of this Standard.

Abutment — the sloping intersection between the roof and a chimney, wall, or other vertical face.

Backpan — the flashing at the upper intersection between the roof and a chimney or skylight.

Batten (tile) — a horizontal structural support or nailing strip from which roof tiles hang. **Note:** *Tile batten is also known as strapping.*