

Concrete roof tiles



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Update No. 4

CAN/CSA-A220 Series-06

May 2010

Note: General Instructions for CSA Standards are now called Updates. Please contact CSA Information Products Sales or visit ***www.ShopCSA.ca*** for information about the **CSA Standards Update Service**.

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If you are missing any updates, please contact CSA Information Products Sales or visit ***www.ShopCSA.ca***.

The following revisions have been formally approved and are marked by the symbol delta (Δ) in the margin on the attached replacement pages:

Revised	CAN/CSA-A220.1-06: Table 1
New	None
Deleted	CAN/CSA-A220.1-06: Clause 4.4.6.9

CAN/CSA-A220 Series-06 originally consisted of **71 pages** (x preliminary and 61 text), each dated **December 2006**. It now consists of the following pages:

December 2006	iii–viii, 3–16, 19–24, 27–30, 33–50, and 53–61
February 2007	ix and x
November 2007	Cover, National Standards of Canada text, title pages (i, 1, 2, 17, and 18), and copyright page (ii)
August 2008	51 and 52
May 2010	25, 26, 31, and 32

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Table 1
Underlayment performance requirements

(See Clauses 4.4.2.1.1, 4.4.2.1.4, 4.4.2.1.5, 4.4.2.2, 4.4.5.2, 4.4.6.2, 4.4.6.4.2, 4.4.6.6.2, and 4.4.6.8.)

(a) For use throughout Canada

Test	Over solid sheathing		Under spaced sheathing	
	Clause	Eave and valley protection	Roll underlayment	Rigid underlayment
Rigidity	4.4.6.2	N/A	N/A	≤ 140 mm
Water permeability	4.4.6.3	No dampness permitted	No dripping permitted	No dripping permitted
Tensile				
Machine direction	4.4.6.4	3.5 kN/m	3.5 kN/m	12.0 kN/m
Cross direction	4.4.6.4	3.5 kN/m	3.5 kN/m	5.0 kN/m
Pliability	4.4.6.5	No cracking or delamination	No cracking or delamination	N/A
Puncture	4.4.6.6	≥ 0.34 J	≥ 0.34 J	≥ 0.34 J
Long-term sag	4.4.6.7	N/A	N/A	≤ 5%
Linear dimensional changes	4.4.6.8	≤ 3%	≤ 3%	N/A

(b) For use in areas having 3500 degree days or less below 18 °C*

Test	Under spaced sheathing			
	Clause	Eave and valley protection	Roll underlayment	Rigid underlayment
Rigidity	4.4.6.2	N/A	N/A	≤ 140 mm
Water permeability	4.4.6.3	No dampness permitted	No dripping permitted	No dripping permitted
Tensile				
Machine direction	4.4.6.4	12.0 kN/m	12.0 kN/m	12.0 kN/m
Cross direction	4.4.6.4	5.0 kN/m	5.0 kN/m	5.0 kN/m
Pliability	4.4.6.5	No cracking or delamination	No cracking or delamination	N/A
Puncture	4.4.6.6	≥ 0.34 J	≥ 0.34 J	≥ 0.34 J
Long-term sag	4.4.6.7	≤ 5%	≤ 5%	≤ 5%
Linear dimensional changes	4.4.6.8	≤ 3%	≤ 3%	N/A

*As defined in the NBCC.

Note: N/A = not applicable.

4.4.4 Test report

The description of sample characteristics in the test report shall include mass per unit area, nominal size, and details of core, facing, and production methods.

The test report shall identify each specimen tested, the machine and cross directions of the material, and the timing of each test. Periods of inactivity shall be documented.

4.4.5 Conditioning

4.4.5.1 General

Conditioning of the samples of each material shall be carried out in accordance with Table 2, using the procedures detailed in Clauses 4.4.5.2 and 4.4.5.3.

4.4.5.2 Conditioning by ultraviolet exposure

The 450 × 1200 mm samples* shall be exposed to ultraviolet sun lamps for 10 ± 0.2 h each day for 21 d (210 ± 1 h) in an enclosure as shown in Figure 2. Ultraviolet light shall be directed at the surface that is to be exposed to sunlight in normal applications.

The lamps and enclosure shall be adjusted so that the temperature of the sample is between 55 °C and 60 °C during conditioning.

*The number of samples needed for ultraviolet conditioning is dependent on the material being tested and its application, i.e., three samples are needed for roll roofing used unsupported under spaced sheathing, and two samples for other underlayments. See Tables 1 and 2.

Table 2
Test sequence and conditioning requirements
for underlayment samples

(See Clauses 4.4.5.1, 4.4.5.2, 4.4.6.3.1, 4.4.6.4.1, 4.4.6.5.1, 4.4.6.6.1, and 4.4.6.7.1.)

Sample		No. 1	No. 2	No. 3	No. 4
		Conditioning			
Test	Clause	None	Ultraviolet lamp exposure	Incandescent lamp exposure	Ultraviolet lamp exposure and accelerated aging
Rigidity	4.4.6.2	yes	N/A	N/A	N/A
Water permeability	4.4.6.3	yes	yes	N/A	yes
Tensile strength	4.4.6.4	yes	yes	N/A	yes
Pliability	4.4.6.5	yes	yes	N/A	yes
Puncture	4.4.6.6	yes	yes	N/A	yes
Long-term sag	4.4.6.7	N/A	N/A	yes	N/A

Note: N/A = not applicable.

4.4.5.3 Accelerated aging

4.4.5.3.1

One 450 × 1200 mm sample, previously conditioned with ultraviolet light as specified in Clause 4.4.5.2, shall be conditioned by accelerated aging. The aging procedure specified in Clause 4.4.5.3.2 shall be carried out 25 times for each sample. The sample shall be stored in the conditions specified in Clause 4.4.5.4 during periods of inactivity.

4.4.6.8 Linear dimensional changes

Tests for linear dimensional stability shall be conducted in accordance with ASTM D 1204 at $85\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ for 24 h. All specimens shall have linear dimensional changes in accordance with Table 1.

Δ 4.4.6.9 — Deleted

4.5 Flashing

Flashing shall consist of not less than

- (a) 0.33 mm galvanized steel;
- (b) 0.46 mm copper;
- (c) 0.46 mm zinc; or
- (d) 1.25 mm lead*.

*Lead is included to allow increased workability.

4.6 Battens

4.6.1 Counter battens

Counter battens shall not be smaller than $10 \times 38\text{ mm}$ and shall be spruce/pine/fir (SPF) standard or better, or oriented strand board (OSB) meeting the requirements of CSA O437.0.

4.6.2 Tile battens and spaced sheathing

Tile battens and spaced sheathing shall be $25 \times 38\text{ mm}$ or $19 \times 88\text{ mm}$ and shall be spruce/pine/fir (SPF) standard No. 4 or better, or a structural equivalent.

5 General installation requirements

Note: See Annex B for a sample installation guide.

5.1 General

Tiles shall be installed over solid or spaced sheathing that is adequate to support the loads involved.

5.2 Tiling over solid sheathing

Where tiles are to be installed over solid sheathing,

- (a) abutment eave and valley protection shall be laid in accordance with Clause 6.2;
- (b) underlayment shall be installed in accordance with Clauses 6.1 and 6.3;
- (c) counter battens shall be nailed through the sheathing into the roof trusses or rafters, in accordance with Clause 7;
- (d) battens, flashing, roofing accessories, and tiling shall be laid in accordance with Clauses 8, 9, 10, and 11, respectively; and
- (e) bedding, caulking, and closures shall be in accordance with Clause 12.

5.3 Tiling over spaced sheathing

5.3.1

Tiles shall not be installed over spaced sheathing in areas with high snow loads as defined in Clause 6.2.1.2.

5.3.2

Where tiles are to be installed over spaced sheathing,

- (a) rigid and roll underlayment shall be installed in accordance with Clauses 6.4.1 and 6.4.2, respectively;
- (b) battens shall be laid as spaced sheathing and shall meet the requirements of Clauses 8.1 and 8.2;
- (c) sheathing, spaced sheathing, or boards shall be installed in valleys, under all flashing not otherwise supported, at all protrusions, and as required by Clause 6.4.2.3;
- (d) abutment eave and valley protection shall be laid in accordance with Clause 6.2;
- (e) flashing, roofing accessories, and tiling shall be laid in accordance with Clauses 8, 9.3, 10, and 11; and
- (f) bedding, caulking, adhesives, and closures shall be in accordance with Clause 12.

6 Underlayment system

6.1 General

6.1.1

The underlayment, abutment, and eave and valley protection system shall

- (a) restrict the entry of water into the roofing space;
- (b) provide free drainage of moisture to and from the eave;
- (c) minimize the number of fasteners exposed to water by positioning the fasteners such that they are covered by successive layers of underlayment or battens; and
- (d) meet the requirements of Table 3.

Note: Underlayment materials should be nominally fastened to maintain required positions before battens are installed.

6.1.2

All damaged areas of the underlayment system shall be repaired before the installation of the tiles.

Table 3
Underlayment usage and sealing requirements
(See Clause 6.1.1.)

Sheathing/underlayment	Normal snow loads	High snow loads*
Roll underlayment over solid sheathing		
use permitted	Yes	Yes
sealing at all laps	Not required	Required
Roll underlayment under spaced sheathing		
use permitted	Restricted†	No
sealing at all laps	Not required	N/A
Rigid underlayment under spaced sheathing		
use permitted	Yes	No
sealing at all laps	Not required	N/A

*Areas with high snow loads are defined in Clause 6.2.1.2.

†See Clause 6.4.2.2.

Note: N/A = not applicable.

Update No. 3

CAN/CSA-A220 Series-06

August 2008

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New	None
Deleted	None

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