Venting Requirements for Unicrete Roof Tile Applications

All Unicrete Tile installations are to conform to the 2005 National Building Code (NBC) or the Building Code having jurisdictional authority (e.g. 2006 Alberta Building Code).

The CSA-A220 Series- 06 Concrete Roof Tiles Standard states in section 10 on page 50; "Attic ventilation shall meet the requirements of the NBC, clause 9.19.1. Where vent grills are required, they shall be equally spaced in the sheathing to allow a free flow of air from each section of the inner roof area and to prevent ingress from the elements. Vent grills shall be secured to the sheathing and sealed to the underlayment."

The relevant NBC 9.19.1.1 Venting section states "… a space shall be provided between the insulation and the sheathing, and vents shall be installed to permit the transfer of moisture from the space to the exterior."

In addition the following points are also outlined in section 9.19 of the NBC.

- Total unobstructed vent area shall be not less than 1/300 of the insulated ceiling area for truss systems (do not include un-insulated soffit area for this calculation).

- Where slopes are less than 2/12 or where roof joists are used (as in some cathedral ceiling applications) the venting formula is 1/150.

- Vents shall be distributed uniformly on opposite sides of the building.

- A minimum of 25% of these vents shall be at the top or bottom of the roof (usually this will permit a 1/1200 formula to be used in calculating top roof vents needed as the 75% requirement will usually be fulfilled by the 2' overhang soffit venting).

- Except where every joist space is separately vented, (TJI's), the joist spaces shall be connected with a minimum 38mm (1.5") purlin running perpendicular to the joist to vent the space between the insulation and underside of the sheathing.

Standard Unicrete Estate vent area is about 31 sq. inches, so there is generally one vent set needed for each 260 sq. ft. of insulated attic area on 1/1200applications. The Slate vent area is about 40 sq. inches so one slate vent will be needed for every 330 sq. ft of ceiling area in the 1/1200 applications. It should be noted that the standard 5" x 24" plastic under tile vent collar has 56 sq. in. of free vented area and therefore 1 under tile vent is needed for every through the tile vent, or 3 under tile vents are required for every sq. ft. of vented area (actually 2.7 vents per sq. ft. of vented area). On Estate tile installations, the volume of air that flows under the 3/8" counter-strapping and also under the top of the tile ridges is a good match for the 56 sq. in. of air the vent collar is rated at. The air moves up to the through-tile ventilation at the ridge if using a ridge type venting system or directly out of the through-tile vent. On Slate tiles installations, the 56" sq. in. of air the large under-tile vents allow into the under tile area, will need to have about 6 ft. of distance parallel to the vent to allow the same volume of air to rise up to the ridge.

Therefore, you should only install one large collar for every 3 truss spaces at the most. If this does not allow a sufficient amount of large collars to be installed to meet the code requirements, a direct through the tile vent should be installed at every collar location.

Unicrete tile roofs have a waterproof rain screen system installed with a minimum of 25mm (1") space between the underside of the tile and the top of the sheathing.
This necessitates using a vent collar (shingled into the underlayment) to vent the attic air through the sheathing and out of the attic, to the under-tile area, and another type of "through tile" vent or a "Flex-Vent" type ridge venting system to vent the air from under the tile area through the tile to the atmosphere. The first vent (taking vented air out of the attic) has always been used; but the second vent - taking the vented air through the tile - has sometimes not been installed. The rational for not venting through to the outside of the tile is; there is much air movement and natural venting occurring, due to the inherent venting properties caused by the loose fit of concrete roof tile. While this argument may have merit, and so far the field experience has not shown a history of any problems in the drier Alberta climate, Unicrete cannot endorse this method. There has been no testing done to establish the inherent venting properties of tile roofs, and snow cover may at times restrict this natural tile venting. The interpretation of "exterior" in NBC 9.19.1 has varied from place to place and at different times. Unicrete recommends checking with the building code department having jurisdiction, for a ruling as to which method should be used on any given roof.

Using a venting weather blocking material (such as Unicrete vented ridge flashing or TRA Flex Vent) under the ridge caps and then leaving the space between the top of the field tile and the bottom of the cap open (no mortar) is a good alternative to through the tile vents. It also improves the rain screen under tile venting by promoting better air flow between the bottom vented eave starter and the ridge of the roof. This method has the advantage of giving even venting for the roof cavity all along the top. Normally there would still be the required under-tile vents installed to take the air from the attic to the under-tile area. In some cathedral situations, the peak of the sheathing may be cut back and screened off to allow attic air-flow. In a more sophisticated cold roof system, the attic may be opened up at the top and the cap may be replaced by a venting cap structure. Standard Unicrete vented starter and ridge flashing is designed to give ventilation to the rain screen area between the bottom of the tiles and the top of the underlay material on top of the sheathing. It will also help to ventilate the attic or cathedral venting area of the roof, as long as sheathing vent collars are installed and/or the top plywood ridge is cut back 1" to 2". The free venting area of the vented starter and ridge metal is about 25% of the actual lineal footage, so for every one foot of metal 3 sq. inches of venting should be factored in for each side. You therefore would need 24 feet of ridge vented on both sides with the metal venting flashing to obtain 1 sq. ft. of vented area.
When using TRA Flex Vent, the formula for net free vented area is 10" per lineal ft. (5" per side) so a sq. ft. of ventilation is obtained for every 14.5 ft. of Flex Vent. This fairly closely matches the gap formed between the cap and the field tile, if leaving the field tile 1/8" (3 mm) off the field tile at the back (lowest) end of the cap. This will leave a 7/8" gap at the front end of the cap between the field tile and the cap due to the cap resting upon the cap underneath it. This in turn will allow a 6 sq. in. space under the cap on each side to vent the 5 sq. inches of air that the Flex Vent is rated at. It is especially important that the cap tiles are properly installed with a good bead of concrete compatible caulking used between the cap tiles (up one side, through the nail-

hole, and back down the other side of the bottom cap) when using the ridge venting systems. The nose of the top cap is then well caulked to the back of the bottom cap as it is installed. This caulking has often not been done in the past due to the reliance on filling the space between the field tile and the cap with mortar - which acts to help secure the caps. As the Flex-Vent type ridge venting systems have now become the norm, it is especially important to ensure that each ridge and hip cap is caulked to the one below it. Of course the tiles should be well supported and nailed or screwed into the supporting 2x2 build up.

One common problem that develops in freeze thaw climates and is usually improperly blamed on the roofer is leaking bathroom fans. In the vast majority of the cases this is not a roof leak, but a condensation issue. When 100% moisture saturated warm air is vented out of the bathroom during a cold snap, any sections of the bathroom fan vent piping that have insulation jacket voids or just poor insulation value, will collect frozen condensation as the moisture falls out of the vented air due to passing through this cold zone (warm air can hold more moisture than cold air). This often occurs at the top or bottom of the insulation blanket where a little of the piping is not properly covered. Once the weather warms up this ice melts and ends up staining an area around the fan or drips through the fan in the bathroom ceiling. If this drip occurs once the weather changes then this will almost always be the cause and the solution is to upgrade the bathroom fan insulation; NOT to do anything from the roof such as caulking the vent.

For additional information on Unicrete Concrete Roof Tiles please contact the Unicrete office.