

# Tile Roofs in Snow Country: The Natural Choice For Aesthetics and Durability

Proper planning and installation ensure a tile roof with elegance, durability, and low maintenance for premier resort in Vail, Colorado

Located 100 miles west of Denver, Vail is one of the finest ski destinations in North America, known for its bright sun, brisk climate, and heavy snow. And, in the heart of Vail Village sits the prestigious Sonnenalp Resort, consistently ranked as one of the top resorts in the world. Not simply a premier hotel for skiers, the Sonnenalp includes a 5,000 square foot spa with jacuzzis and an indoor/outdoor pool, two restaurants, two bars, and conference facilities.

In 1992 and 1993, the Sonnenalp underwent major renovations, which included the installation of a new roof. Together with the architect, owner Johannes Faessler decided to install a tile roof. Although this decision may surprise some who associate tile roofs with homes in the Sun Belt, to Faessler and his advisors a tile roof was the natural choice and one that, in the eight years since its completion, has proved both prudent and cost-effective.



## **Primary Concerns: Aesthetics and Durability**

Because the Sonnenalp Resort lies in the center of Vail Village, its roof must not only withstand the harsh mountain weather but also offer an aesthetically pleasing introduction to the village for resort guests and tourists. According to Charles Frey, resident manager of the Sonnenalp, durability and aesthetics were exactly what the owners had in mind when they selected a tile roof. "The original structure was an older building and just not what the owners considered Sonnenalp standards, so they wanted to build something new. I believe Mr. Faessler, the owner, selected a tile roof to give it a European look, which is our image anyway. And, I believe he was also looking for something more durable than shingles." The previous roof consisted of wood shakes.

*Mark Wennstedt, president and owner of Source Products Group*, the tile distributor for the Sonnenalp project, recalls that the owners were particularly concerned about lifecycle costs. "They were looking for a permanent product, one that had good lifecycle costs that would be able to withstand the freeze-thaw elements of the Vail Valley. They had heard about broken tile in the past and were concerned about it. So, we went in there with the Vande Hey Raleigh concrete tile product and reviewed everything from snow retention to the venting system to the tile installation, those types of things, because a tile roof is only as good as the system it's installed with."

According to Wennstedt, who has been in the tile roofing business for almost 20 years, "Most roofs wear out, but concrete tile typically won't wear out." Tile roof manufacturers - both concrete and clay - typically offer warranties of at least 50 years. Wood and metal roofs usually do not last that long. Wood shake roofs last a maximum of 15 to 20 years; the intense sun and dryness of this mountain region can cause the wood to split, crack, and curl, ruining a roof's appearance. Most wood roofs are also a fire hazard, which is a tremendous concern, as evidenced by the vast fires in the western states this year. Clay and concrete tile roofs, in contrast, have achieved an unconditional Class A fire rating, which applies over the lifetime of the product.

Most metal roof manufacturers offer 20- to 25-year warranties, but exposure to the elements can change the color or fade the paint on metal roofs. Although the roof remains functional, its aesthetic appeal may be significantly reduced.

By adding pigments to the raw materials, tile manufacturers can produce tiles with colors that last indefinitely. Roofing tiles are also available in a wide variety of colors and styles. For the Sonnenalp Resort, the architect used a custom blend of five different colored tiles in various shades of red and brown, which they placed in a random pattern on the roof. Manufactured by Vande Hey Raleigh Architectural Roof Tile, it is a flat concrete tile that Vande Hey Raleigh calls "Modern Slate." And, because Vail is a heavy snow region, they used a heavy duty tile that weighs more than regular tile and has greater transverse strength, which reduces the likelihood of tiles breaking from sliding snow and ice. Plath Construction installed 410 squares of this tile on the Sonnenalp roof, for a total of more than 55,000 tiles.

Gordon Pierce, founder and chairman of Resort Design Associates International, served as the architect on the Sonnenalp renovation of 1992 and 1993. Recipient of major architectural awards and designer of many of Vail's most prominent structures, Pierce's firm is now developing a design for a 70,000 square foot addition to the Sonnenalp Resort, which includes underground parking, conference and retail space, and 60 additional hotel rooms. The addition, scheduled for completion by Christmas 2004, will have the same type of tile roof - both in color and style - as the 1992-1993 renovation. "Because of the size and quantity of tile we will be ordering, we will have the manufacturer do a custom color match," states Mike Foster, architect and project manager for the new renovation.



**"Modern Slate" tile used on the Sonnenalp**

As an architect, Foster appreciates the many color and style choices available with tile. "You can get nice color variety. You can start to play with some of your colors and your theme throughout the whole building, which is kind of fun for us. And, the colors last." Overall, Resort Design Associates International has experienced great success with tile roofs in the Vail region. In fact, Foster notes that, "For the commercial work that we do, probably 90% to 95% is tile roofs. I think that's because of the good luck that we've had with tile roofs and also that distinctive look they bring. Both the town of Vail and Beaver Creek - we do a lot of work up there as well - have pretty strict design guidelines, and we know that we can get a tile roof to work within their guidelines and achieve the performance that we're looking for. We do a lot of houses too and there we often go to a shake roof but, personally, I prefer a tile roof over a shake roof any day."



### **Roofing Challenges in Snow Country**

Despite these accolades, many people in the mountains have negative perceptions of tile roofs because some builders and designers have failed to plan properly. Regions of heavy snowfall and dramatic temperature changes such as Vail require not only roofing products that can withstand the elements but also underlying structures that are designed with these extreme conditions in mind.

Proper installation is also vital. Wennstedt explains, "We like to say that it takes a little bit more of a craftsman to install a tile roof properly. It is a permanent roof, so not only is the tile going to last for many years, but you want everything to last. The tile roof is only going to last as long as its weakest link. So, typically, there's more involved in a tile roof: it takes a higher caliber, more professional contractor who is really focused more on quality than production." Bob Vande Hey, general manager of Vande Hey Raleigh Architectural Roof Tile, agrees. "You have to have special considerations for tile because it's a unique product. You can't do a tile roof the same way you do other products. However, there are certain basics that have to be considered for all roofing products, especially in extreme climates."

In Vail, one of these basic considerations is severe winter weather. Average snowfall in Vail is 335 inches a year. Consequently, the roof of the Sonnenalp Resort was installed in two phases. Renovation began in April 1992 and ended in November 1993, with a break in construction during the winter of 1992-1993. Some part of the resort remained open and operational at all times. Mr. Frey of the Sonnenalp explains: "There were two considerations. Winter conditions make it difficult to build. Sometimes it's 10 or 15 below zero. It would be technically impossible. You could do some interior work but definitely not the outside work. On the other hand, winter is our strong season and, at that time, compared to summer was extremely strong. You made your money in Vail in the winter in those days."

Other basic considerations when selecting and installing roofs in snow country include heavy snow loads, melting snow, ice formation, and large temperature differentials. But, architects and roofers can address these issues by designing buildings with the roofing system in mind and by installing devices that minimize structural damage.

According to Bob Vande Hey, "In a heavy snow area like Vail, structures should be built in such a manner to keep snow on the roof." Snow acts as an excellent insulator, and holding snow on the roof is actually safer than allowing it to slide off. To accomplish this, roofers install snow guards or snow fences. Both devices capture and hold snow on the roof until it melts gradually in the spring. They are standard for any type of roof in the Vail Valley, not just tile.

Basically, snow guards are pieces of metal that hook onto the tile itself and stick up about 3 or 4 inches from the roof surface. They are made out of a metal that will not rust, typically copper such as those on the roof of the Sonnenalp Resort or sometimes stainless steel. To secure the snow guards, a screw goes through the tile into the plywood of the roof deck. Roofers stagger them across the roof in a set pattern so that they hold the weight of the snow as it accumulates.

Melting and sliding snow and ice can pose additional hazards, however, such as ice damming, leaking, and breaking tiles. This is particularly true in the centennial state's mountain regions, where dramatic temperature changes in a 24-hour period can cause severe thermal shock to roofs. "Even though the median air temperature outside may be 30 degrees," says Wennstedt, a longtime Colorado resident, "an exposed tile on a roof could be much warmer than that - perhaps 50, 60, 70 degrees - because the sun is shining and you're at 8,000 or 9,000 feet. The sun is very intense. But, what can happen is, clouds can roll over in a very brief time and can cover the sun and it can start to snow. So, that temperature on the roof can drop down to below freezing very very quickly." In the Vail Valley, roofing products must be able to accommodate significant temperature differentials.

Likewise, ice dams can form when heat from the sun above or heat loss from the building below melts snow, which then drains to a shadowed point or eave line on the roof and freezes. Obviously, melting snow from the sun's radiant heat is unavoidable and occurs regardless of the type of roof selected, but proper building design can minimize its impact.

Heat loss from below can be prevented by installing a "cold roof system." The key to a cold roof system is proper ventilation or "venting," which ensures that heat from the building escapes before it reaches snow on the roof and that whenever snow melts, it melts from the top down and not from warming tiles below. According to Bob Vande Hey, the best way to provide a cold roof system is through well-ventilated attic space, which allows free air flow between the building's insulated interior and roof deck.

Clearly, ice damming resulting from radiant heat and/or heat loss from the building is a potential problem in heavy snow country, regardless of the roofing system chosen. Wennstedt recommends adequate venting for any kind of roof in this region. And, for roofing products to be most successful, architects must address this issue from the concept and initial building design.

Some people also worry about the weight of a tile roof, particularly in heavy snow areas such as Vail. The ultimate weight of a roof is made up of a "dead load" and a "live load." A dead load is anything permanently affixed to the roof, including such items as the tile, nails, plywood, and snow guards. Conversely, a live load is anything not permanently affixed to the roof and varies across the country. A snow load is one type of live load and is the same for all roofing products in a particular region.

According to Bob Vande Hey, "The cost to build a structure for tile is usually a difference between 7 pounds for dead load of asphalt shingles and 15 pounds for tile or hard roofs. So the difference between them is 8 pounds per square foot. The cost to do that is very minimal." Likewise, architect Mike Foster has few, if any, concerns about snow loads and tile roofs. "That's pretty much a non-issue for me," he declares.

With careful building design and the installation of snow guards (or snow fences), tile roofs in snow country perform well. Moreover, heavy duty tiles, such as those used on the Sonnenalp Resort, are extra strong to help prevent tile breakage. Certain finishes that are applied to tile also have a roughness that increases over time to create a surface similar to sandpaper, which further reduces the incidence of sliding snow and thus tile breakage.

## **A Satisfied Customer**

If installed properly, tile roofs are also virtually maintenance free. Charles Frey of the Sonnenalp reports, "We have had absolutely no problems. The roof handles the snow excellently." Each year in June, resort employees go up on the roof and inspect it. In the first couple of years following the renovation, they had to replace a few tiles but otherwise the roof has been "pretty maintenance free," states Frey. The Sonnenalp Resort is not unique in this regard. In fact, Wennstedt claims that, "If it's done properly the first time, there's really nothing that has to be done to maintain a tile roof."

For tile roof owners, the key selling points are low maintenance, elegance, and durability. As architect Mike Foster notes, "Customers are very satisfied with tile roofs. They like the look and the durability. Once it's up and in place, you get a good, lasting material." According to Wennstedt, "The clients who have problems with tile roofs in the mountain areas are typically those who focus on one thing - cheap. The bottom line for them is, how cheap can I get a tile roof put on my house. That's where a lot of the bad press comes from and from people who use tile on buildings they shouldn't or they don't use the right system with it."

As with any other aspect of a building project, the longevity of a tile roof depends on thoughtful planning, proper building design, and quality workmanship. Bob Vande Hey sums it up this way. "With the Sonnenalp Resort, every aspect was thought about ahead of time, so the tile was no problem. If you plan ahead before you build and you think about the right things, then incorporate them, you'll have a successful project like the Sonnenalp."

## **Source Products Group**

Source Products Group, Inc. is a roofing and slate products distributor. As the Rocky Mountain regions largest importer/distributor Source handles a wide variety of both roofing and slate products. Slate products include imported and domestic slate roofing, large slabs, floor tiles, wall tile, and custom etched products. Roofing products distributed in the Rocky Mountain region are Vande Hey-Raleigh Architectural roof tiles, Northern Roof Tiles, Bartile concrete roof tiles, Gladding McBean clay roof tiles, Zappone copper roof shingles, Millennium Stainless Steel Roof Shingles, and A full selection of roofing accessories.

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