

Ask Jon Eakes

OVERVIEW: Changing the roof or roof covering on a house

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As I look at my own database, I see that I have almost 100 answers to specific questions about roofs and roofing. Despite a good search engine, that much scattered information can get confusing. Let me make just a couple of overview statements to help guide you in getting your existing or new roof to work -- and then give you a link to the best "consumer's guide to roofing" I have found.

The roof is a whole system of elements, not just shingles or membranes

To only think about shingles as being your roof is a serious error. There are many cases where people attempt to stop a leak by repairing the roof or even changing all the shingles, only to discover that the problem was under-the-roof condensation of moisture coming up from the house through the ceiling. Yes, very large ice deposits can be found in attics that had nothing to do with leaks on the roof above.

You must not think about the roof, but the roofing system over your home. The "roofing system" actually starts with the drywall of the ceiling below, then the air and vapour barriers, then the insulation, then the ventilation, then the roof deck, then the underlayment, then the flashings and finally the roof covering like shingles or membranes. Got the point? If you only work on the top layer, you could be ignoring a lot of festering problems.

The attic must be inspected and dealt with before re-roofing

Most credible roofers will walk on a roof and test for soft spots, rotted decking, and plan to replace some of the deck before giving you an estimate for the job. Unfortunately it is rather rare that a roofer actually inspects the attic, looking for signs of problems and indications as to where there is condensation in the winter or leaks through the roof – and then if they are tracing leaks, are they coming from nail holes associated with shingles, or with flashing problems. If a roofer gives you a quote from a standing-on-the ground visual inspection, it is highly likely that you are going to have problems with the job, either in "unexpected overcharges" or poor performance.

What is SLOPE and PITCH and how are they measured.

It is not practical to measure or work with the angle of a roof expressed in degrees, so more direct construction related measurements are used – and totally confused. Slope and Pitch are no longer the same things although they were until roofs became unsymmetrical.

The SLOPE of a roof is a measure of how much a roof falls from a measure of 12 inches held horizontal on the roof. The Pitch of a roof is a fraction found by dividing the span of the roof (wall to wall) by the height of the roof (top of wall or attic floor to ridge).

As long as roofs were built symmetrical, these two gave very similar results, but with modern roofs often having the ridge off centre, they have become two very different things with the Pitch talking about the structure of the roof and the Slope defining water runoff on each face of the roof. So if you are not a building designer, forget about Pitch. All roof coverings deal with Slope. In fact, most roofing references today that refer to pitch, actually mean slope.

Why can't Slope be kept simple?

It would be nice if they kept Slope simple, but unfortunately the evolution of building has left us with two different conventions for expressing the same Slope – fractions and ratios which look like this: 4/12 slope (fraction) is the same thing as 1:3 slope (ratio). To keep them separate we should probably read the first as a "4 in 12 slope" and the second as a "1 to 3 slope ratio". When you look at a table of

slopes you will notice that the fraction always has a “/12” on the end and the ratio always has a “1:” in the front.

Where do these numbers come from?

Start by placing a ruler or square in contact with the roof and the leg running out horizontally. At the 1 foot or 12 inch mark, measure down to the roof. That easily you have the 4/12 slope. With a carpenter's square you can even put marking stops, called a Square Gauge Set, on the square at 4 on one leg and 12 on the other leg (or 8 and 24), and that will allow you to draw the roof angle onto rafter ends. 4/12 is easy to measure and easy to work with.

If you need to work with the ratio convention – start with the slope as a fraction ($x/12$). Now divide the rise into the run – which means simply divide the first number into both numbers. The first number divided into itself will always give “1”, and the result of dividing that same number into the 12” inch run will give you the ratio. $4/12 \rightarrow 1:3$ and $8/12 \rightarrow 1:1.5$. If you need to convert the other way, divide the second part of the slope ratio into 12 and you get the first part of the slope fraction.

If you are working with slopes expressed as fractions, the higher the first number, the steeper the roof. If you are working with roof slope ratios, the lower the second number the steeper the roof.

Shingles must be installed according to the slope of the roof

When a roof is too flat, with little or no slope, you cannot use shingles at all but must use a continuous membrane. On very low slopes, shingles cannot shed water.

There is a category called “Low Sloped” roofs where longer tabs are used on the shingles to help to shed water. Low Sloped shingles are no longer sold in Canada because with our snow and ice, they always allowed water to back up under the shingles. That is why, in the graphic at the right (click on the graphic and it will get larger) the No Shingle zone is extended to the 4/12 minimum in Canada. Most Standard and Steep sloped roofs require 4 nails per shingle, properly placed.

Manufacturer's warranties require that the ends of the tabs adhere to the shingle below

The manufacturer's warranties also requires that the shingles are installed in a manner and under conditions that allow the self-adhesive strip of adhesive that comes on the shingle to effectively adhere to the loose end of the shingle tab above. If conditions do not allow that to happen, then there is no warranty on the shingles unless they are manually glued down, called "tabbing". The industry doesn't make any clear statements, but it appears to take about 70deg F (21deg C) for the adhesive to malleate and adhere, shingles in the sun reach that temperature with outdoor temperatures as low as 40deg F (5deg C). Hence working on shingles in weather colder than 40deg F (5deg C) usually requires manual tabbing; applying a dab of glue under each corner of each tab to assure the tabs are glued down during freezing weather - the sun can't do that for you. Most roofers avoid working in cold weather as they need to charge extra for the “tabbing”. Actually most roofers working in very cold weather don't tab at all although all the manufacturer's warranties require this. Extremely dusty conditions could also prevent the self-adhesive from working and roofers should return to check if tabbing is necessary. Roofers rarely do that as it is a lot of work and it is difficult to not make a mess, but if it can be shown that the tabs were not adhered to the underlying shingle, there is no manufacturer's warranty and the installer could be held liable for shingles blowing off. See this entry on the Self-Adhesive Strip.

Working on shingles that are too hot can also cause problems of deformation by walking on them. So asphalt shingles should be installed between 40 to 85deg F (5 to 26deg C).

When we get to the very steep or Mansard roofs, gravity will not work in allowing the self-adhesive to stick. On these roofs the manufacturers require for their warranty, 6 nails per shingle, and manually glue every tab under all conditions. This is rarely done, and hence manufacturers rarely pay out on warranty for Mansard roofs. All they have to prove is that the loose edges and corners of the tabs were not adhered to the shingle below; it is no longer the manufacturer's problem -- the warranty installation criteria was not followed. For a detailed research report on gluing down tabs, which includes the Mansard problems, click here.

Most shingles can be subject to problems -- there is no one bad manufacturer in the business. Even after you get the whole attic perfect, there have been many shingle failures over the years and several class action suits. This industry wide, but little talked about problem seems to be related to the extremely unstable supply of bitumen that all companies face. The bitumen used to make shingles is a by-product of the petroleum refining process. The shingle manufacturers have to test and adjust every truckload of their raw materials. That is a tough task for a mass production facility -- but that is the reality for our most popular roof covering, asphalt shingles.

An OVERVIEW CONSUMER course in roofing

Although I love to give you specific answers to specific questions, for a really comprehensible consumer course in roofing, roofing choices and hiring a roofing contractor I highly recommend that you spend several evenings reading through a web site offered by a Montreal roofing contractor, one that has done us all the great service of using his wide experience to lay out the overview without simply making a commercial for his own business. In addition he covers all roofing possibilities with great insight -- helping you to choose what is right, or not right for your roofing system. Check out www.consultantpg.ca. I wish I had written something this good myself, but Paul has done such a great job that I have to give him the nod.

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