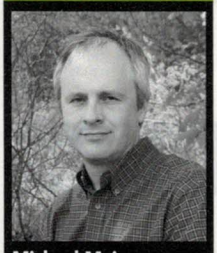
ask the experts

YOUR QUESTIONS—PRO ANSWERS

experts



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Bath-fan venting for cold climates

For the first few years that we owned our current house, I wrestled with various ways to vent the upstairs bathroom showers. Everything I tried resulted in condensation and ice problems. Even with double R-19 batts over the vent pipe, I still had problems with condensation and freezing. As we prepare to build a new house, are there proven ways to address this cold-weather condensation issue?

—KEITH
via email

Michael Maines: It's a great question, because it's not something I often see done well. Before we get to some specific advice for cold-weather installations, let's start with some basic duct advice.

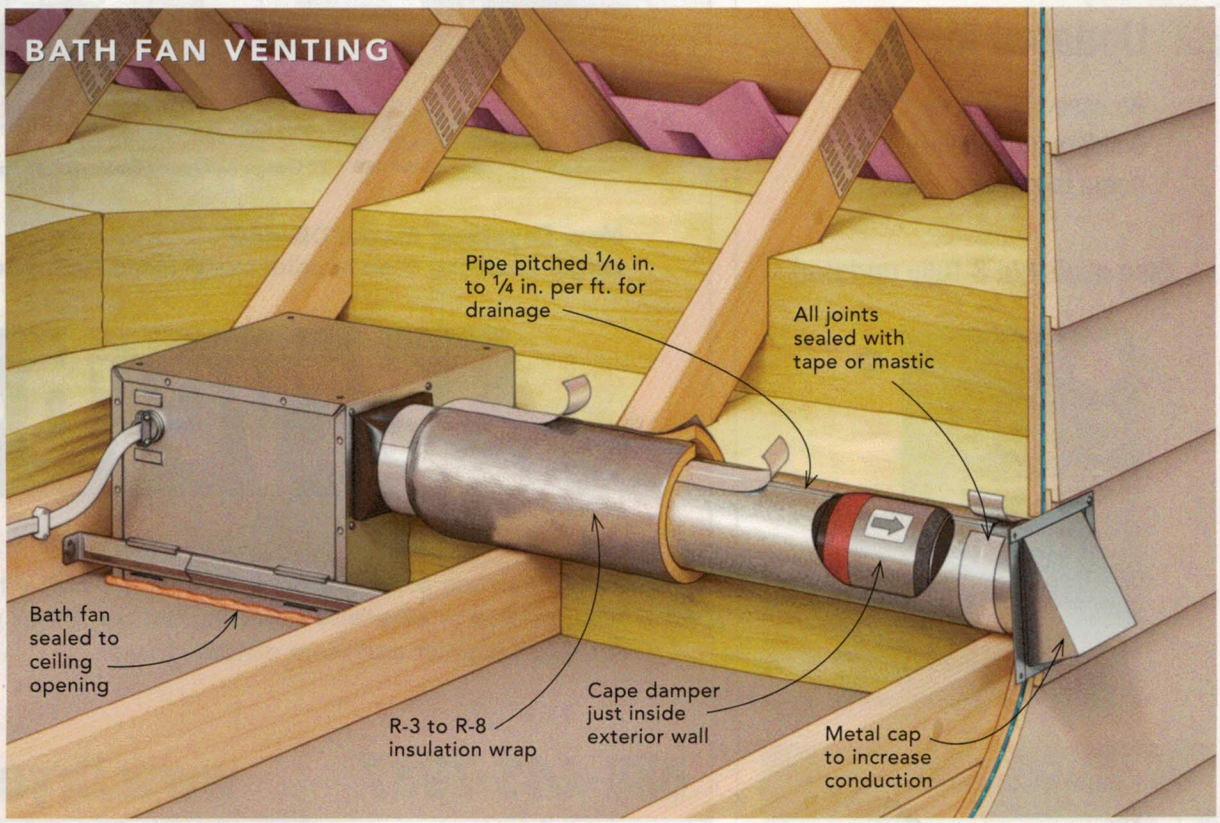
I recommend that my clients vent their bath fans out a gable wall if at all possible (when not using an HRV or ERV, that is). If you vent through the roof, condensation will drip back into the interior. If you vent through a soffit, where attic vents are often located, the moisture will get sucked back up into the attic or roof venting.

Use rigid metal ducting (aluminum or galvanized steel) with lengthwise seams facing up and joints sealed with foil tape or duct mastic, or rigid plastic pipe. Be sure to slope the duct a bit for drainage to the exterior. Rigid duct is better than flex duct, and bigger duct is preferable, especially if the runs are long.

Best practice is to wrap the entire duct with R-3 to R-8 insulation, but, if nothing else, you should at least wrap the 6 ft. of duct just inside the termination point, which is where condensation is most likely to happen. Keep the vent low and run the insulation over the duct.

You can also minimize heat loss by adding a Tamarack Cape Backdraft Damper or other auxiliary damper near the outlet.

For the problem of the exterior vent icing up, 70°F interior air at



Photos: top, courtesy of Michael Maines; middle and bottom, *FHB* staff. Drawing: Christopher Mills.

25% relative humidity (which is fairly low) will condense at 33°F, so there is going to be condensation in cold weather. With a fan pushing 110 cu. ft. per minute, and air at 80°F and 80% relative humidity, as you might have when taking a nice steamy shower, you're creating almost ¾ cup of condensate during a 10-minute shower when it's 25° outside.

The common solutions to this ice problem are to use a higher-powered fan, use a larger-diameter, shorter duct run, and wrap the pipe with better duct insulation. You can also run the fan longer (at least 10 to 15 minutes after showering is a good baseline) so the ice melts or doesn't freeze in the first place. Also, make sure the damper at the fan itself is working so moist air from the bathroom doesn't constantly leak into the duct, where it will condense and freeze, even when the fan isn't running. It can also help to start running the fan before showering, which will draw warm interior air into the duct run and help warm it up before you really start injecting a lot of steamy air. Finally, I recommend using a metal wall cap instead of a plastic one. Metal is highly conductive, and warms up faster when the fan is running.

Making sense of deck loads

I'm designing a deck in northern Wisconsin where the ground-snow load is 60 psf (lb. per sq. ft.). When sizing the footings, beams, and joists, do I need to design them for the snow load (60 psf) plus the live load (40 psf) for a total of 100 psf, or just for the snow load since it's the larger of the two? In other words, is the ground-snow load additive to the live load or not?

—WILL P.
via email

Mike Guertin: There's been confusion about how to address snow load and live load on decks for a while. Some code officials, engineers, and contractors have added the two loads together when designing decks and others have just done as you suggest, basing the calculations on the larger of the two loads, either snow load or live load. There wasn't a clear answer in the International Residential Code until the 2015 version, where a footnote to the ledger fastener table [R507.2] reads, "Snow load shall not be assumed to act concurrently with live load," which means you only have to design for the greater of the two loads—in your case, the 60 psf snow load.

Though most of the country is still using older versions of the IRC, you can point to the 2015 (or 2018) IRC footnote as a qualified reference should a question arise from your local building official. Still, the local building official often has the last word, so it's always good to check how he or she addresses snow and live loads.

Fastening vinyl over foam

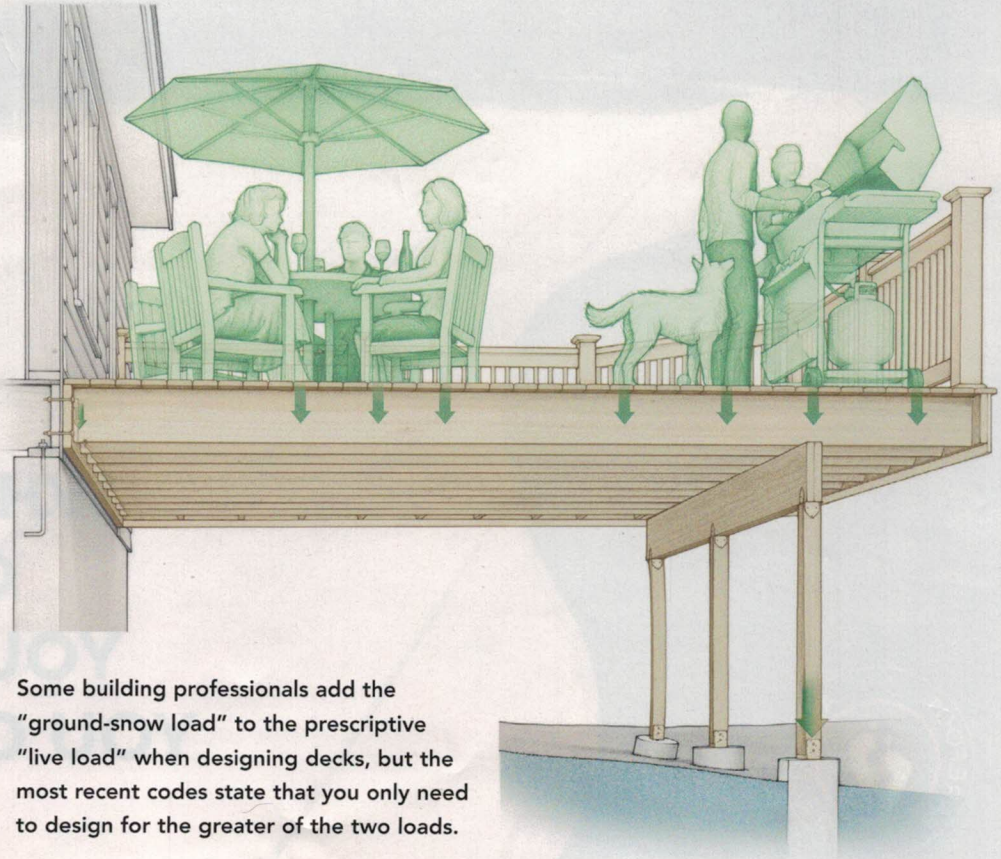
After going through my remodeling budget, it looks like vinyl siding will be in my near future. I still want to put 2-in. XPS rigid-foam insulation outboard of my structural sheathing, so my question is: Is it OK to fasten the vinyl siding through the foam, or do I have to apply furring strips?

—JOSH BRAUN
via email

Mike Guertin: As with a lot of construction, on the one hand you have the installation instructions from the manufacturer and/or association, and on the other you have what is being done in the field. I'll try to give you the full picture and let you make the call.

The by-the-book answer to your question is that vinyl siding manufacturers require a flat, solid supportive surface, and limit foam installed under their siding to a maximum of 1 in. thick. So, technically speaking, you can't nail through or even use 2 in. of foam, and you can't use furring strips (which are

WHAT ABOUT SNOW LOADS?



Some building professionals add the "ground-snow load" to the prescriptive "live load" when designing decks, but the most recent codes state that you only need to design for the greater of the two loads.

Drawing: Christopher Mills