

Here you see house with new roof and some of the 4 tons of old insulation and drywall etc. that was gutted from the upper floor.



Found this pic here showing how the underlayment was installed. I don't remember if this is layer 1,2, or 3. They are all the same material and the first 2 were either stapled or nailed which is both wrong



This one was taken upstairs during clean up stage facing towards east:



The small windows there are above porch which is not conditioned but has also been gutted and insulated using XPS. There's a chance moisture travels up those walls where the old door is still hanging.

The surface mold was quite a bit of work to remove. I used TSP which worked fine but it's quite potent. Supposedly it prevents future mold growth as well that's why I used it:



The floor above porch has new blow in cellulose insulation. The windows have been replaced, too.



It's funny that up until now no one in this forum believes it's the roof. All other experts I talked to were quick to blame the roof and nothing but the roof. You can see here the gaps between metal cap and

panels. Lots of roofers told me “you gotta have a z-closure” to prevent wind-driven rain from entering:



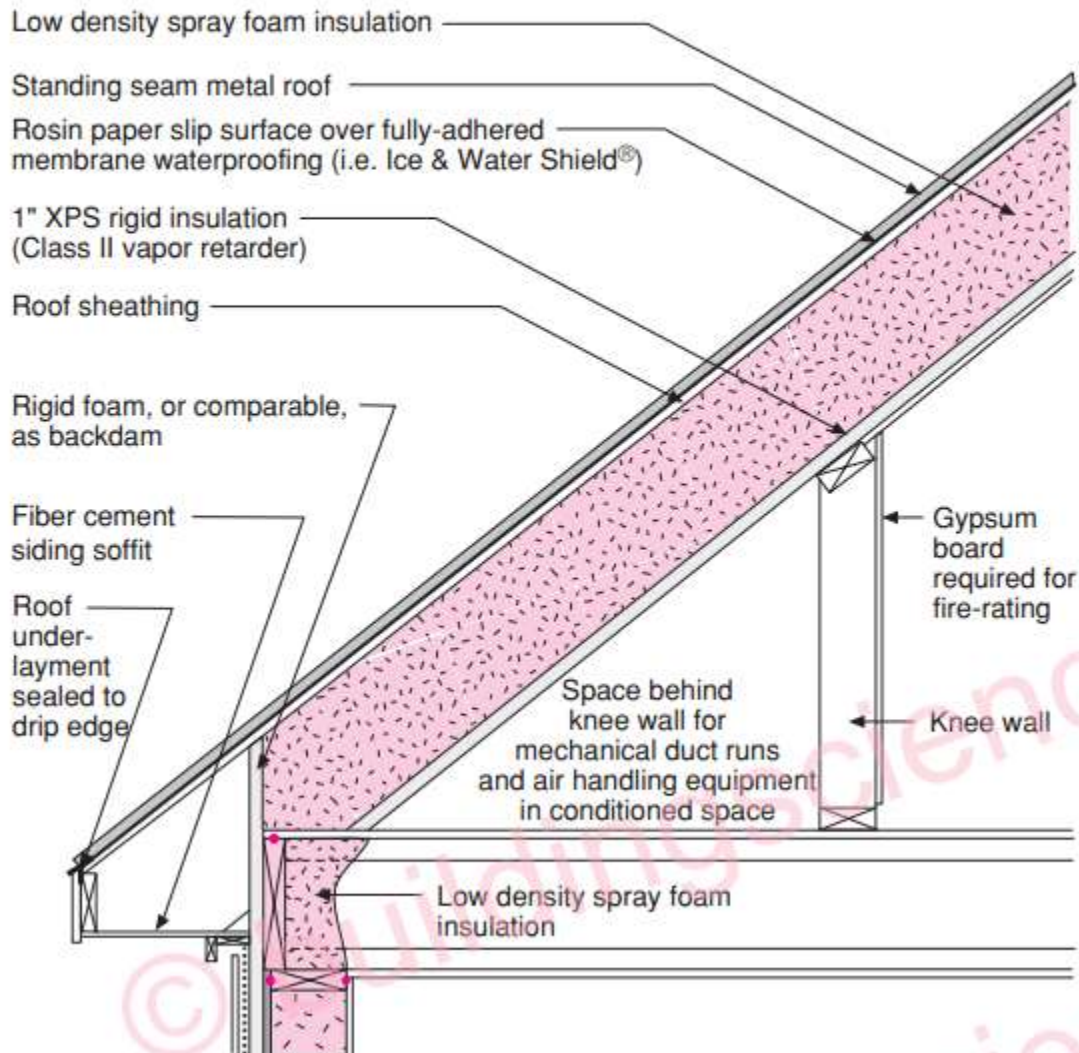
And indeed the water dripping from the ceiling started at the end of May right after a strong thunderstorm with unusual wind driven rain patterns.

This pic shows the XPS over the Icynene after I started taking it back down again. When I took out the top 2 sheets, they were wet behind. More than a pint of water behind each XPS sheet, at least it looked like that much.



Why put XPS over Icynene or open cell foam:

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Check their [RR-0404: Roof Design](#) document. It even says 'standing seam roof' so it fits exactly what I have done!!

This was when I put it up, as you can see the foam looks good:



I used 'great stuff' from the can to seal between the XPS boards. The sealing process was quite efficient and quick. Water penetrated only from a handful of places very slowly. Each board at the top had a lot of water behind it and we had no idea... The spray foam was soaked.

This is what the small room above porch looked like after completion



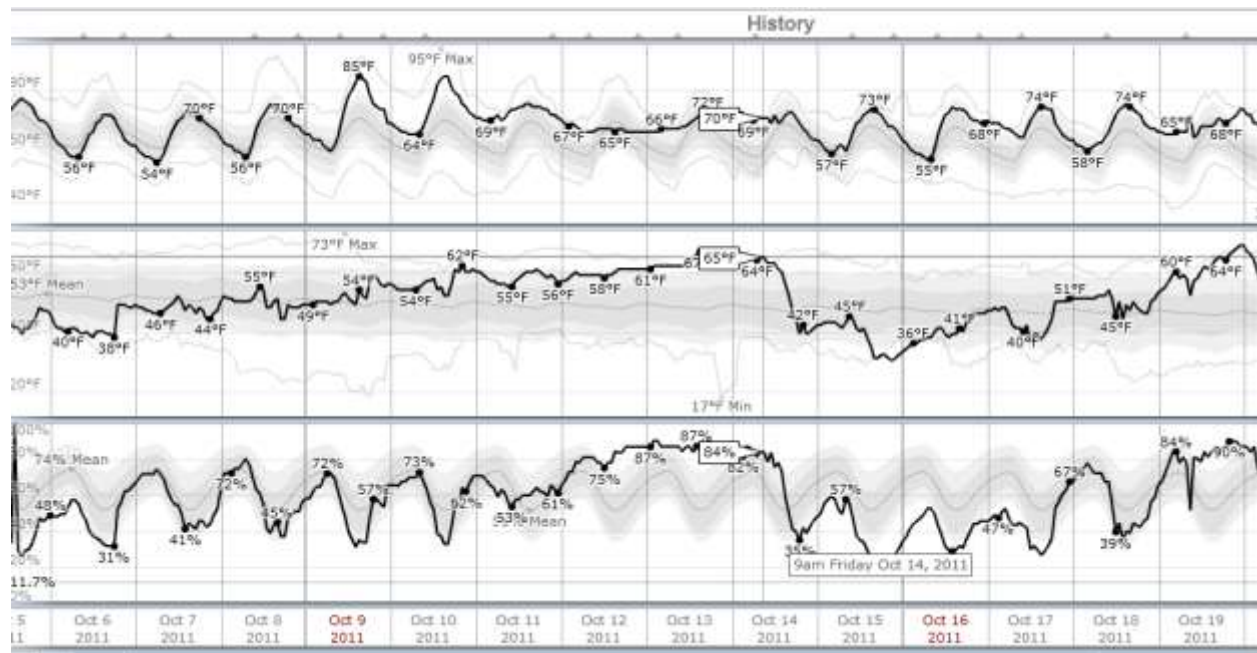
This is how the moisture problem started to manifest itself, wet drywall:



Initially at a handful of spots you would only see this at the very top: There's moisture apparently escaping from behind the foam and condensing on the XPS surface:



Was the foam not installed correctly? The foam was installed when the RH and hence dew point were relatively high. 70F air temp at weather station, 65F dew point, and over 24h of over 84% RH before spray foam was applied:



It could be the planks were a little moist when they started in the morning but I didn't check that day.

This is what happens every single day after around 10AM since beginning of June:



Based on what I have seen the house so far I have reason to believe the moisture is coming out of the foam. It feels that way, too. So I did an old trick and taped thick, transparent plastic on the foam and stuck a thermometer inside. I also had another thermometer (the one above) as control point:



Check this out, around 11:30 AM the RH shoots up to 100% while the other exposed thermometer is still in the 50s:



Then the foam guy came and told me I can cut out anything I want and he'll patch it for free, since there are a couple of holes in the foam and it deflects at certain areas.

I cut out a couple of areas and the foam appears to have 'hair' on the exterior side. Which leads me to believe the foam actually didn't stick at all to the roof deck:



Here's another piece:



OK so I stuck a thermometer in the gap ***behind the foam*** for fun.

Here are the results which show all day every day the same thing: behind the foam we always have more absolute humidity than outdoors AND inside the house.

This morning:



The exact same time behind the foam:



You can clearly see same temperature but much higher RH. The absolute moisture difference behind foam vs. interior side vs. outdoors appears to be fluctuating. BTW, the hole was covered with the foam pieces I cut out and the thermometer was stuck between planks and foam.

So how much of a gap are we talking about:



Between 1 and 2 inches.

I am starting to believe this may be a problem all over not just at the two spots I selected.

Would that cause condensation? Why? Why not?

This is the piece I pulled out, also shows there was no adhesion to planks:



Thank you for your time and advice; I appreciate your help in solving this mystery very much!