

Understanding Ponding Water

Ponding Water Defined

Roof ponding is where water gathers on a flat roof. So how much ponding is acceptable on a flat roof? Specifically, water must remain on the roof for 24-48 hours for the National Roofing Contractor's Association (NRCA) to consider it ponding.

What is the adequate slope to achieve this? The NRCA, The Asphalt Roofing Manufacturers Association, The Mid-West Roofing Contractors Association and The American Institute of Architects all agree a minimum of 1/4" per foot will ensure that roofs will drain.



Ponding water due to poor slope design.

Plenty of drains, roof well maintained, but the low areas between the drains needed crickets to push water to drain.



Ponding water due to a lack of maintenance and plugged drains clogged.

The Effects of Ponding Water

If you have this leftover water, you may notice it collects in dips in the roof or around drains. Roofs with ponding see standing water that will, in time, cause damage.

Algae and vegetation growth may cause deterioration of the roof surfacing and/or membrane. In cold weather, ice movement with changes in temperature may scour the roof and ultimately damage it. Any damage to the surface may allow water to infiltrate the system, therefore reducing the thermal efficiency of the insulation, and could also allow water to enter the building.

The Effects of Ponding Water - cont.

Ponding water poses the greatest risk to a roofing membrane, since it not only shortens its service life, but can lead to more serious life safety concerns. The big concern with ponding water is the increase of the load on roof decks, which could compromise the structural integrity of square foot. When loads and deflections exceed the designed conditions, this can lead to a roof collapse.

Take a look at the following charts:

| WATER DEPTH (INCHES) | WEIGHT (LB./SQ. FT.) | WEIGHT PER SQUARE (LB./100 SQ. FT.) | EQUIVALENT |
|----------------------|----------------------|-------------------------------------|--------------------------------|
| 1 | 5.2 | 520 | The average weight of a tiger. |
| 2 | 10.4 | 1,040 | The average weight of a horse. |
| 3 | 15.6 | 1,560 | The average weight of a cow. |

So, if you have 3 inches of ponding water covering approximately 200 sq. ft., you have an extra 3,120 lbs. or 2 cows standing on your roof!

If you live in a cold weather climate, it is also important to understand the water content of snow. This may range from 3% for light/dry snow to 33% for a heavy/wet snow, and nearly 100% for ice. Let's consider snow with an average water content (18%), and 5.2 lbs. per square foot.

| AVERAGE SNOW DEPTH (INCHES) | WEIGHT (LB./SQ. FT.) | WEIGHT PER SQUARE (LB./100 SQ. FT.) | EQUIVALENT |
|-----------------------------|----------------------|-------------------------------------|---|
| 12 | 11 | 1,100 | The average weight of a Polaris ATV. |
| 24 | 22 | 2,200 | The average weight of a 4 door sedan. |
| 36 | 34 | 3,400 | The average weight of a Cessna aircraft |

The Effects of Ponding Water - cont.

Ponding water due to poor slope design and lack of drainage.



So, if you have 36 inches (3 feet) of average snow covering approximately 200 sq. ft., you have an extra 6,800 lbs. or 2 Cessnas on your roof!

How did we reach that conclusion?

$36'' \times 5.2 = 187$ lbs. per square foot

$187 \times .18 = 34$ lbs. per square foot (average water content of 18%)

$34 \times 200 = 6,800$ lbs. per square foot

Ponding water must be understood when implementing the Best Practices, we consider every day. The Best Practice to assure positive drainage is to specify a minimum slope of $\frac{1}{4}''$ per foot across all areas of the roof.

Article by Tremco Roofing and Building Maintenance

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