

Taming the beast called 'ponding water'

Preparing for ponding water before and during the roof installation can help contractors avoid liability later

Since the beginning of time, our ancestors designed roofs to shed water. They knew that nature and the elements represented powerful forces not to be taken lightly. For this reason, they strove to get water off of and away from a building as quickly as possible, in order to avoid certain disaster.

Only in relatively recent times have people begun to harness and control natural forces with some

weighs 5.2 lbs/square foot and many structures cannot handle this extra load. Since it occurs in low areas of a roof, a pond also becomes a repository for debris, sediment, and chemical emissions. As these materials collect, the result may be anything from a small farm to a hazardous chemical bath, both of which can break down many roofing materials.

Most importantly, if the roof membrane in a ponded area sustains damage, all of this water will drain into the building.

Architects will tell you that they design low-slope roofs to shed water. We all know, however, that the best laid plans do not result in a perfect world or even a roof which always slopes in the right places, as designed.

In fact, nearly all flat or low-slope roofs hold some water for a day or more after rainfall.

As a concession to the design world, the NRCA has classified "undesirable" pond-

ing water as standing for more than 48 hours, though ponding can pose a threat even in shorter timespans.

Fact is, ponding water is as inevitable a part of low-slope roofing as maintenance traffic and must be taken into consideration when selecting

roofing materials and detailing rooftop penetrations. A close look at roofing specifications reveals that materials are frequently selected based upon "ideal" design criteria rather than the specific conditions at a jobsite. A building owner is often left with a roof that cannot accommodate standing water and with a warranty which excludes such conditions.

While it is difficult to accurately predict the location and quantity of ponding water which will occur prior to construction, or completely eliminate it afterwards, a roofing contractor can recommend roofing practices and systems to minimize its impact, and protect himself in the process. It is first important to evaluate the possible causes of ponding water.

Ponding water can be traced to any of several factors. First, a roof may pond water as a result of poor maintenance programs which contribute to clogged drains, gutters, and downspouts. The build-up of rooftop debris or displaced gravel ballast frequently blocks water flow and creates ponds.

Secondly, the building's rooftop drainage system may not have been designed properly. There may be too few drains or the building may not slope to drain (or gutter) adequately. Many contractors make the half-joking observation that too often the internal drains are located at *high* points on the building.

Construction errors also contribute to standing water. Architectural plans often call for sloping the roof deck to direct water flow to drain valleys, with



Few commercial, industrial or institutional building owners have structures with aggressive slopes to shed water, as seen on this church.

success. Accordingly, modern technology has given us the tools to design and waterproof flat roofs. Flat roofing, however, has brought with it a new hazard: ponding water.

A matter of "deep" concern in the roofing industry, a one-inch-deep pond

Bluestone uses heat welding only for ALL of our roofing systems.

carefully placed crickets doing the rest of the work. Yet, incorrectly-sized or damaged crickets might create larger drainage problems than they solve. Also, improper installation of the insulation or original roofing system—causing ridging, blisters, or uneven bitumen—can impede water-flow.

Finally, ponds form as a result of such common conditions as building settlement and deck deflection. Planning for these conditions is difficult, yet their impact upon building drainage can be tremendous. Any 1/4 in 12 design slope can be reversed by a flexing metal deck, resulting in an oversized bird-bath.

Few would argue with the axiom that it is best to get water off of a roof. But a contractor also needs to understand the environment in which he works, which in roofing is less than ideal. This means being a problem-solver as well as preparing for worst-case conditions.

In reroofing applications, the roofing contractor has the opportunity to build corrective measures into his bid which attacks a ponding water problem at its source. Drains or tapered insulation/crickets should be added to alleviate ponding in many instances.

An architect or owner would be well advised to also hire the services of a consulting/structural engineer should ponding be excessive and potentially threatening to the structure. Nevertheless, it is often cost-prohibitive or impractical to eliminate all standing water from a rooftop. This is where the proper selection of roofing materials becomes critical.



When rooftop penetrations are numerous, prefabricated flashings and membrane panels are most effective in protecting a structure against ponding water.

In instances where ponding water will not be completely eliminated, select a roofing system which by design does not impede drainage. Mechanically-fastened and fully-adhered single plies use smooth, non-ballasted membranes which allow the free-flow of water.

While this kind of surface will not eliminate ponding caused by other factors, it will not add to or create a new cause of ponding. In contrast, gravel and ballast often interfere with water flow and encourage sedimentation.

In reroofing, if a ponding condition exists, use roofing materials that incorporate seaming or attachment methods not compromised by standing water. A welded seam will stand up indefinitely to ponded water while glued or bitumen-bonded seams may be weakened by moisture both during and after installation.

Use prefabricated roofing materials wherever possible. This will minimize the impact of standing water upon the performance of the roof. Seams made under factory conditions, with such techniques as dielectric welding, assure the roofing contractor of excellent membrane performance at both low and high areas of the roof.

The roofing contractor should also use preformed and prefabricated flashings as further insurance against damage by residual water.

The problems associated with ponds are magnified at curbs and penetrations since the independent movement of vertical and horizontal planes contribute to splits and tears in typical field-manufactured flashings. Further, one-piece flashings are easier to install on-site and their effectiveness will not be reduced by adverse jobsite conditions.

Roofing contractors need to be cautious when selecting roofing systems. Ensure that the materials have



Even with design efforts to the contrary, ponding water is still a common occurrence in low-slope roofing.

been designed to withstand, and are in fact warranted against ponding water.

Unfortunately, marketing pressures have led some manufacturers to write warranties which do not explicitly exclude ponding water, while their specifications require a contractor to create positive drainage. This practice shifts the liability of removing water from the roof entirely to the roofing contractor and exposes him to future action should he not be capable of accomplishing the impossible.

A roofing system can only be considered viable under ponded conditions if: 1) the materials and application methods are completely resistant and have been designed to work in standing water; 2) the manufacturer's specifications do not require the contractor to create positive drainage in order to be eligible for warranty; and 3) the warranty does not exclude ponding water as a condition for coverage.

If any or all of these three factors are missing, the roofing contractor should select another roofing system which meets these criteria.

In conclusion, preparing for ponding water before and during roof installation, means understanding the nature of the beast. Diligent efforts at designing and building rooftop drainage systems will help to prevent residual water on the greater percentage of roof area.

But experience and history remind us that good intentions and sound design practices rarely result in a pond-free roof. There are just too many variables.

A roofing contractor/building owner/architect/engineer/consultant team must therefore take time to understand the strengths and limitations of the roofing materials they specify and install. Choosing a roofing system manufactured, engineered and warranted to function effectively in rooftop ponds may not eliminate the beast, but will go a long way toward taming it. **RSI**

All of Bluestone's multiple ply roofing systems are designed and warranted to perform under unlimited amounts of ponding water. **EXPENSIVE TAPERED INSULATION IS ELIMINATED. YOU GET MORE ROOF FOR LESS MONEY!!**