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Zinc in Rainwater Runoff from ZINCALUME® Plus Roofs

ZINCALUME (Galvalume®) Plus coated metal roofs feature an alloy coating on the steel that is approximately 55% aluminum and 45% zinc and an organic resin top coating. The ZINCALUME coating has been well documented to provide outstanding corrosion resistance and long service life – at least two to four times that of pure-zinc coated roofs (galvanized). Long service life and low corrosion rates mean little zinc is being dissolved from the sheet. Moreover, the organic resin top coating contributes as a sealant and has a lifespan that is driven by the climate in which the project is located.

Steelscape is committed to protecting the environment and to providing accurate information and product support to our customers. As an active member of several steel industry trade associations, we are supporting the on-going investigations to identify those factors which influence the amount of zinc present in rainwater runoff from a ZINCALUME Plus roof. These factors include, but may not be limited to:

1. How much acid is present in the rainfall;
2. The intensity of the rainfall (i.e. how many inches per hour it is raining);
3. The duration of the rainfall (i.e. how long does the rainfall last);
4. The total area of the roof;
5. The temperature of the roof surface.

Based on several studies, predicting the absolute concentration of zinc present in roof runoff for any rainfall situation is nearly impossible, due to the combination of factors indicated above.

Studies have determined that the amount of acid present in the rainfall is the most important factor. The pH of the rainfall is a measure of how much acid is present. The lower the pH is, the more acidic the rainfall is. Water that has no acid present would have a pH of 7.0. Normal rainfall would have a pH of about 5.4 to 5.6. The reason that normal rainfall has a pH lower than 7.0 is that carbon dioxide is absorbed into the rainfall from the atmosphere. The carbon dioxide produces carbonic acid, a very weak acid. At pH levels from 5.6 down to about 5.0, extremely small quantities of zinc would be present in rainwater runoff from a ZINCALUME Plus roof.

In the United States, the pH of rainfall west of the Mississippi is most often above pH 5.0. The rainwater runoff from ZINCALUME Plus roofing in those localities is unlikely to contain more than very small trace quantities of zinc, quantities so small they would be barely detectable even using the most sophisticated techniques. As rainfall moves east across the Mississippi, it picks up acid that has been discharged to the atmosphere, primarily by coal fired electric generating plants. The highest concentration of acid in rainfall (the lowest pH) is usually found along the northeast coast of the United

States. For the reasons stated at the outset, predicting the quantities of zinc that would be present during rainfalls in this region is difficult and complex. To generate a number and say that this is “the number” is virtually impossible.

Although the acid rain areas could be expected to produce a higher zinc runoff rate than the western, non-acid rain areas, we believe the zinc concentration in acid rain runoff will still be exceedingly small. One measure of this is the outstanding long-term performance of the ZINCALUME Plus roofs. We have inspected ZINCALUME Plus roofs 20 – 25 years old that are located in acid rain areas. They are, without exception, in excellent condition and have many years of life ahead of them. This simply would not be the case if the zinc were corroding or dissolving significantly. We nonetheless are supporting studies underway to better understand and characterize the factors that would affect the rainwater runoff from ZINCALUME Plus roofs.

These steel industry associations are investigating methods to remove even trace amounts of zinc from rainwater runoff. Wetlands are an excellent method for removing zinc. Wetlands change the zinc from a form that is easily dissolved in water to one that is not at all soluble in water, even acidic water. The small quantities of zinc that may be present in the runoff from ZINCALUME Plus roofs are then locked up in the soil and not available for uptake by plants or animals. Other tests are being conducted to determine if non-wetland soil conditions, e.g., topsoil covered with lawn or meadow growth, will also remove zinc from rainwater runoff.

If you have any questions, please contact your Steelscape sales representative, or Steelscape directly at (888) 553-5521 or at productinfo@steelscape.com.

Sincerely,



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