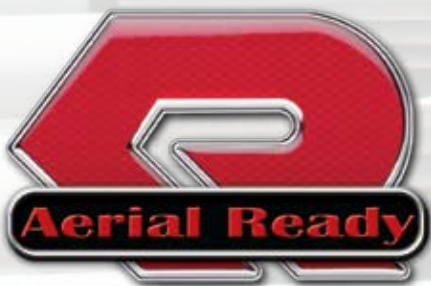


# rosenbauer



## Rosenbauer Hot Dipped Galvanized Aerials



## What is it?

The component is immersed in a bath of molten zinc between 815-850° F (435-455° C). During galvanizing, the zinc metallurgical bonds to the steel, creating a series of highly abrasion-resistant zinc-iron alloy layers, commonly topped by a layer of impact-resistant pure zinc.

Hot-dip galvanizing is often referred to as just galvanizing. The term is often used incorrectly to describe steel coated with zinc-rich paint, electro-statically (plated) applied zinc, and mechanically applied zinc. All of these methods of applying zinc to steel for corrosion protection are very different from hot-dip galvanizing and may be inappropriate for many situations and environmental exposures.

Hot-dip galvanizing (HDG) is the process whereby all major aerial components are immersed in a vat of molten zinc, resulting in a metallurgical bonded alloy coating that protects the steel from corrosion.



Hot-dip galvanized steel has been used for more than 100 years in a myriad of projects across the world. Specified not only for its superior corrosion protection and durability, but also for its low maintenance, economical benefits, low environmental impact and even aesthetics.

Rosenbauer's hot dipped galvanized aerial components are specially designed to allow the zinc to entirely coat the inside and outside of metal surfaces. The hot dip galvanized process is also done after all weldments have been completed to prevent the zinc from burning off during fabrication. As an option, Rosenbauer's hot dipped galvanized aerial components can be painted to provide a more traditional looking machine.



## Why is it needed?

Aerial apparatus typically have a 20 year targeted replacement cycle, but normally, this process pushes out well past this time frame. An aerial device is typically the most expensive and maintenance-prone piece of equipment in the entire apparatus fleet, requiring a great deal of preventative maintenance.

Rusting is a common problem of steel aerials. Many of these issues can be a direct result of the geographical region and environment where the aerial is in-service. As an example, trucks based in cold climates in which trucks are housed in a nice warm station and then out in below freezing conditions for a lengthy period of time can experience condensation inside the steel sections of the ladder. Typically, these trucks pull into bays that have radiant heaters mounted directly over the ladder. This contributes to the condensation issue.

When departments choose a Rosenbauer hot dipped galvanized aerial, they will enjoy drastically reduced maintenance. The reduction in maintenance is in the area of corrosion reduction and aerial lubrication. All hot dipped aerial components come standard with a 25-year corrosion warranty (5 years more than the best competitor's warranty). The cathodic barrier that the zinc produces allows for a more slippery surface requiring less white lithium lubrication. Hot dipped galvanized aerial components are a must for any department looking to keep their aerial investment running safely and smoothly for the anticipated life of the machine.



*(Top Left) An aerial exposed to freezing conditions. (Top Right) Radiant heaters mounted on the ceiling.*

## More Facts

- Using zinc to protect steel from corrosion (hot-dip galvanizing) is a 150-year-old practice.
- Corrosion is caused by the inherent tendency of metals that, when subjected to air and moisture, to revert to their original earthy forms, usually an ore state. They do this through a chemical or electrochemical reaction with the environment.
- Galvanizer's kettles are set at temperatures ranging between 815° F and 850° F (435° C to 454° C).
- A galvanizer knows that a piece of steel should be immersed for a specific amount of time in order for the metallurgical reaction between zinc and iron to reach completion. The completion of the metallurgical reaction is observed when bubbling of the molten zinc in the kettle stops. At this point, the galvanizing is complete and the steel is removed from the kettle to cool.
- Zinc seals the underlying steel from contact with its environment. If the steel is exposed to the elements due to mechanical damage, the surrounding zinc corrodes sacrificially, protecting the underlying steel from corrosive attack.
- The zinc coating on galvanized steel is uniform: inside, outside, corners and edges.
- The hot-dip galvanized reinforcing steel bond with concrete is at least as great as the bond of bare steel to concrete.
- When the Brooklyn Bridge was built, over 14,500 miles of hot-dip galvanized wire were used for its four main cables. Over 100 years later when the bridge underwent massive rehabilitation, the hot-dip galvanized wire was in excellent condition.
- Hot-dip galvanized steel lasts longer today than it did 20 years ago. Because of environmental laws, our air is cleaner and less contaminated with corrosive emissions.
- A reddish-brown staining infrequently develops on the surface of a newly galvanized piece of steel that is comprised entirely of intermetallic layers. The steel is not rusting; there is just a very small amount of iron in the zinc-iron alloy layers that is oxidizing, causing the staining to occur. This does not cause any adverse effects on the corrosion performance of the galvanized steel.
- Corrosion annually costs the U.S. economy 3.2 percent of the gross national product, over \$279 billion. Indirect costs to the public could raise the percentage to as much as 6 percent. Some indirect costs of corrosion are: lost productivity due to traffic delays, accidents caused by corroded hand and guardrails, excessive use of nature's raw materials and energy to replace corroded steel.

**It doesn't coat inside and out.** False — Due to Rosenbauer's special manufacturing process, all metal surfaces are completely coated with zinc, inside and out. If you recall, this is done after the weldment procedure. Simple zinc based paint will not bond to metal like the hot dip process and only done on the outside of the structure.

**It is hard to repair.** False — Although rare because of the heat that is associated with the zinc bonding to the steel, small pieces of the top layer of zinc can chip off or scratch. Rosenbauer has a quick and easy three stage process to repair any chipped, scratched or damaged galvanized components.

**It is expensive.** False — A galvanized ladder costs roughly \$5,000 more than a painted aerial device. Due to its superior corrosion resistance, departments will save tens of thousands of dollars in that they never will need to repaint the aerial and an increased service-life of the device.

**It looks bad.** False — As hot dipped galvanized structures age, they change in appearance until they develop a dull grey color. Depending on use and climate conditions this can take several months to fully process. It is important to remember that the hot dipped galvanized process is done to prevent corrosion and not for beauty. As an option, we can paint over the galvanized structures with a special paint to allow for a more traditional looking machine.

## What will others say?



## *The Spec*

Prior to assembly, each aerial ladder section shall be hot dip galvanized. The galvanizing process will permeate each ladder section to prevent rust and corrosion and not be merely an over-coating. The galvanized aerial ladder sections shall be provided in the natural finish eliminating the requirement for finish paint and the subsequent requirements for touch up paint

and/or total repaint after a period of time due to nicks, chips and corrosion resulting from hitting the ladder many times in use. The galvanized ladder shall reduce the maintenance requirement for grease once or twice a year, based on duty cycle. The aerial ladder sections are galvanized inside and out, including base rails, hand rails, diagonals, rungs and K-Braces. This process eliminates the rusting, scratching or paint chips on the aerial sections. Galvanizing has been recognized as an effective way to protect steel from corrosion. Galvanizing shall provide a barrier and cathodic protection from corrosion. During the galvanizing process, the complete aerial ladder sections shall be immersed in molten zinc. Through diffusion, the zinc shall bond to the steel at the molecular level. The resulting zinc coating shall provide a barrier that shields the steel from the environment.

A galvanized steel corrosion protection warranty shall be provided for the aerial ladder sections for a period of 25 years. The conditions of the corrosion protection warranty shall be as follows.

1. Aerial manufacturer will not be held responsible for any damage due to high temperatures from fire conditions, chemicals, or any material that could attack the galvanized surface.
2. The galvanized coating warranty shall cover re-coating of affected areas only.
3. Should any warranty claim occur, it shall be inspected, reviewed and approved by the aerial manufacturer prior to any work being completed.
4. Any authorized warranty work shall be only performed by the aerial manufacturer or its designated repair personnel or facility. Any repairs completed by un-authorized repair shops or personnel shall cause this warranty to be invalid.
5. Transportation costs associated with this corrosion protection warranty shall be the responsibility of the purchaser.
6. This warranty shall cover parts and labor to the affected area or parts only and shall not be deemed to include entire ladder sections or the entire aerial device. This warranty does not include aerial rung coverings.
7. Warranty shall not cover damage due to lack of specified normal maintenance and service as outlined and required in the service and operating manuals provided with the apparatus.
8. Warranty shall not cover damage from accidents, abuse, physical and mechanical damage, and all other conditions not considered as "normal" operating conditions.
9. The obligations of the aerial manufacturer pursuant to the foregoing warranty with respect to any such aerial ladder sections shall be limited to the cost of bringing the affected area into compliance with the specifications or removing any defects in materials or workmanship.