

# ATTENTION!

## THE APPEARANCE OF RED RUST ON SHEARED EDGES OF GALVANIZED STEEL IS TYPICAL.

### Corrosion Benefits of Zinc Plated (Galvanized) Steel

The vast majority of SCAFCO products are produced with zinc coated steel. The zinc coating is produced through a process of "hot-dip" galvanizing where unprotected steel is immersed in a bath of molten zinc. This process produces a thin layer of zinc on the steel surface. The hot-dipping process produces steel where the zinc is molecularly bonded to the surface of the steel. This process has two benefits in the resistance to corrosion of the galvanized steel.

The first benefit is that the zinc coating encapsulates the base steel. This prevents oxygen and water from interacting with the base steel. The zinc sacrifices itself preventing the steel from losing structural integrity in the presence of a corrosive environment.

The second and often more important benefit is galvanic action. When zinc and steel are in contact a small electrical current is produced. This is called galvanic action. The major benefit of galvanic action is protecting the base metal, even when it is exposed to the environment. When galvanized steel is damaged either by scratching, or in the case of sheet steel, shearing, the base steel is exposed to the environment. During the action of shearing the steel sheet, a thin layer of zinc will drag down the face of the cut by the shear. Initially, if the base steel is exposed, a small layer of red rust ( $\text{Fe}_2\text{O}_3$ ) may form. However, as time passes, galvanic action takes place. The surface layer of zinc will sacrifice itself to prevent the base steel from corroding further. Over time, the red rust will turn from the bright red color to a dark black surface signifying the end of the corrosion of the base steel. At this point, no further deterioration of the base steel will occur.

In the case of hot-rolled steel, working of the steel or if the galvanizing is damaged by scratching, the base steel may be exposed, and a small layer of red rust ( $\text{Fe}_2\text{O}_3$ ) may form. However, as time passes, galvanic action takes place. The surface layer of zinc will sacrifice itself to corrosion to prevent the base steel from corroding further. Over time, the red rust will turn from the bright red color to a dark black surface signifying the end of the corrosion of the base steel. At this point, no further deterioration of the base steel will occur.

Occasionally, red rust stains are seen on galvanized steel surfaces, like silo roofs. This likely is not the corrosion of the base metal, but is simply a rust stain from untreated carbon steel overhead rusting with subsequent drips on to galvanized surfaces below. This is a surface stain and is not the corrosion of the base metal under the zinc coating. The stain may be removed with a light scrubbing with an Oakite or vinegar solution. The overhead untreated steel should then be painted or treated to prevent future rust.