Info Sheet – What is WHITE RUST

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What is White Rust?

White rust is a naturally forming white deposit that develops on galvanized steel due to corrosion process.

Zinc products are susceptible if the surfaces become and stay wet while in a pack or bundle. Capillary action pulls water into the space between tubes where the absence of airflow contributes to the accelarated formation of naturally forming corrosion products.

White rust is most commonly encountered during transport and storage when material becomes wet and the trapped moisture between touching surfaces is unable to escape and is also referred to as 'wet storage stain'.

Early stage white rust can be wiped away before it more severely damages the surface coating. The rate of corrosion depends on the environmental conditions, and in wet/humid conditions damage can occur within days.

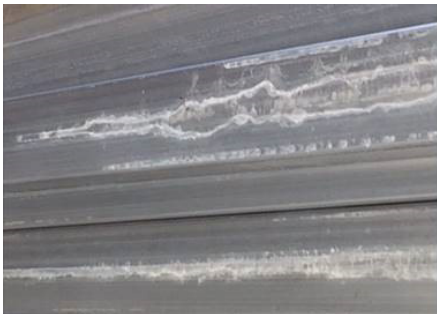

Figure 1: Early Stage 'white rust'.

White rust is damaging to the appearance of the surface as it prematurely consumes the zinc which protects the underlying steel. In advanced cases local zinc is consumed and unprotected steel surface begins to develop into red rust.

Figure 2: Advanced white rust, with red rust.

Galvanized Steel – zinc protection

Zinc coating, or galvanizing, protects steel from rusting.

- Zinc bonds well to steel
- Provides a barrier over steel
- Reacts in preference to steel.

Zinc is 'self-sacrificing' as it is more active when coupled with steel.

It offers protection to exposed steel edges and minor surface damage.

In technical terms the steel is ***cathodically protected*** by the zinc.

Zinc corrodes at slower rate than steel does in the same given environment

In harsh environments or for extended lifecycles the durability can be increased by applying a thicker zinc coating or by applying appropriate paint products.

A new zinc coating undergoes a series of reactions to form a stable zinc-carbonate patina.

This is a conditioning process which develops over time and can be simplified as;

1. Zinc reacts with oxygen in the air to form zinc-oxide.
2. Zinc oxide reacts with available moisture in the presence of available oxygen to form a zinc-hydroxide.
3. Zinc-hydroxide reacts with carbon dioxide in the air to form a stable zinc-carbonate ***patina***.

In this normal situation there is no white rust formed and the product will become a dull grey colour over time as the patina develops. The patina creates a natural barrier that slows corrosion rates and extends the durability of the coating.

A powdery white rust build-up of zinc-oxide develops in situations when there is moisture and no airflow. If the white rust is not addressed early the corrosion products will progress into a zinc-hydroxide which is more difficult to remove.

Other interim Protection

A clear paint is commonly applied to galvanised pipe and tube during manufacturing to act as a barrier to reduce the development of white rust. This paint provides an improvement to white rust performance but is not able to prevent damage when product remains wet. The coating is temporary and can be removed if required.

Oil films can be applied to repel water and provide anti-corrosive protection.

White Rust Resolution Process

Through stringent inspection, audit, warehousing and freight delivery processes Orrcon ensures packs are delivered dry and in prime condition.

In the event packs are received wet then any affected product should be immediately quarantined and a claim raised with your supplier. Orrcon Steel will investigate claims from customers for wet packs or white rust. Claims with supporting evidence must be raised promptly and no later than 2 weeks from delivery. Claims raised after 2 weeks or with insufficient supporting evidence are not able to be resolved and will be deemed invalid and/or most likely caused due to customers own storage and handling method.