

RUST BULLET®

Corrosion Control Technology

A more effective solution

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Introduction

- Corrosion has historically been known as "the cancer of metal" and yet, only short-term fixes have been available. To amplify the problem, the application of these "short-term" temporary products requires the removal of existing rust, and/or extensive, time consuming, and often involved complicated surface preparation before applying the "temporary fix."
- It has long been a truism that painting over corrosion is worse than leaving the rusty surface uncoated. This is because most paints or coatings form a film over the rust, forming a barrier. This barrier traps moisture, the enemy of iron and steel, against the metal surface allowing continued destruction of the metal underneath.
- The estimated annual US economical loss as the results of corrosion is \$279 billions

Typical impacts due to Corrosion

- Reduction of metal thickness leading to loss of mechanical strength and structural failure or breakdown. When the metal is lost in localized zones so as to give a crack-like structure, very considerable weakening may result from quite a small amount of metal loss.
- Hazards or injuries to people arising from structural failure or breakdown (e.g. bridges, cars, aircraft etc).
- Loss of time in availability of profile-making industrial equipment.
- Reduced value of goods due to deterioration of appearance.
- Contamination of fluids in vessels and pipes (e.g. beer goes cloudy when small quantities of heavy metals are released by corrosion).

- Perforation of vessels and pipes allowing escape of their contents and possible harm to the surroundings. For example a leaky domestic radiator can cause expensive damage to carpets and decorations, while corrosive sea water may enter the boilers of a power station if the condenser tubes perforate.
- Loss of technically important surface properties of a metallic component. These could include frictional and bearing properties, ease of fluid flow over a pipe surface, electrical conductivity of contacts, surface reflectivity or heat transfer across a surface.
- The increase in precision metal parts and components in our manufacturing process and products means slight amount corrosion can have very significant impact on their effectiveness and efficiency.

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- Mechanical damage to valves, pumps, etc, or blockage of pipes by solid corrosion products.
 - Added complexity and expense of equipment which needs to be designed to withstand a certain amount of corrosion, and to allow corroded components to be conveniently replaced.
 - Corroded electrical contacts can cause unpredictable failure in abnormal functions on electronic, avionic or hydraulic control sensors which can cause significant accident that resulted in loss of human life, properties, and equipment.
 - Corrode equipment cause more energy wasted and subsequently caused more demand on power generation thus lead to more pollution*

Existing Corrosion Protection Technology

- ◉ Corrosion Conversion
- ◉ Corrosion Encapsulation
- ◉ Cathodic Protection
 - Sacrificial Anodes
 - Impressed Current
- ◉ Climate Control*
- ◉ Use non corrode materials*

Rust Bullet Technology

- Rust Bullet combines all existing corrosion protection technologies into one single technology.
- Rust Bullet is based on multiple layers, renewable, maintenance free concept.
- With various DFT, it offers various corrosion protection level and durability.
- Basic DFT offers 10 years corrosion protection against atmospheric corrosion attack

Rust Bullet Corrosion Protection Design Principles

● Impermeability

- Rust Bullet is designed to be impermeable which is completely unaffected by the specific environment it is designed to block, such as humidity, water or any other corrosive agent such as gases, ions or electrons. Rust Bullet has a high dielectric constant and has amazing adhesion to the underlying surface in order to avoid any entrapment of corrosive agents. The high solid content of non leafing Al flakes blended with polyurethane and inactive provided exceptional high resistance to corrosion cell forming beside forming layers of armour liked surface.

● Inhibition

- Rust Bullet is designed to inhibit corrosion. Rust Bullet consisting essentially of polyisocyanates with unreacted, active NCO groups, non-leafing aluminum flakes, xylene, isobutyl acetate, thickener gel and molecular sieve; and applying the coating material to a rust covered surface, whereby the active NCO groups in the coating material react with water in the rust to dehydrate the rust and produce a strong coating which keeps out water and oxygen which corrode surfaces.

● Cathodically protective pigments

- The non leafing Al flakes also provide the cathodic protection that protect the substrate from corrosion attacks. The Al flakes shift the potential of the environment to a less corrosive cathodic potential. With the two unique patented chemical composition. Rust Bullet offers multiple corrosion protection against atmospheric and direct corrosion attack in considerable time that other products lack of. Furthermore, if the surface is breached by accident and the substrate is exposed, the Al flakes will ensure the corrosion will not spread.

How Rust Bullet® Technology Works

Rust Bullet® is not a paint in the ordinary sense of the word. Rust Bullet® requires no preparation, except the removal of large flakes of loose rust by light scraping or brushing. When applied, Rust Bullet® does not form a film immediately, but rather it penetrates the porous rust reaching the metal underneath. Our exclusive method of protection* dehydrates, or dries out the corrosion by a chemical activity, allowing the resin to solidify into a tough coating with phenomenal adhesion.

The corrosion particles becomes intertwined in the resin matrix and remains a permanent part of the coating. The subsequences coat of Rust Bullet® fills any pinholes in the first coat and build up to become a nearly impenetrable coat. The layers of interlocking Al flakes form a new surface that protects the metal against corrosion attack, they Al flakes also served as a sacrificial anodes. The polyurethane component serves as an anti moisture function.

When all components combined together, Rust Bullet becomes a corrosion free, fire retarding, chemical resistance and armour like coating.

Facts of Rust Bullet Technology

- Rust Bullet[®] Awarded an Unprecedented Two Patents on Unique Corrosion-Control Formula
 - U.S. Patent No. 6,809,150 & U.S. Patent No. 6,872,767
- Ease of Application
- Scientifically Tested against the leading rust/corrosion protection products and out-performed all others
- Rust Bullet may be applied over rusty and clean metal
- Superior adhesion
- Warranty for 10 years for DFT 6 mils for private application.
- Warranty for 10 years for DFT 9 mils for commercial application
- With higher DFT protection period can be increased proportionally.

Facts of Rust Bullet Technology

- Little or no surface preparation required
- Easy to apply and maintain
- Excellent Resistance against Mechanical and Chemical Attack
 - Tested by acknowledged independent test institutes in comparison to competitive products (see ASTM-test results in the Appendix)
 - Outstanding mechanical resistance
 - Very good resistance against aggressive weathering in very different climates (incl. UV-radiation)
 - Outstanding resistance against sea water / salt water
 - Withstand all chemical fuel and commercial grade acids
- Environmental Friendliness
 - RUST BULLET® is free of zinc, chromates, heavy metals and acids
 - VOC compatible VOC compliant
- Fire Retarding
- Meet EPA Drinking Water Coating Regulations.

Additional Protection/Application Functions

The exclusive method for excellent UV resistance* adds to the protection, and although it requires no topcoat, any conventional paint can be applied over the last coat of Rust Bullet for decorative purposes. Always follow the manufacturer's guidelines for any topcoat.

Rust Bullet® has by far the best abrasion resistance of any of the tested products, and is therefore quite difficult to scratch. If a scratch or chip in the coating does occur, it will rust in the breached area because it cannot protect what it does not coat, but rust will not proceed beyond the breach. Rust Bullet® will not lift, blister, or peel away from its leading edge in any significant degree. Simply reapplying Rust Bullet® over the scratch or chip reseals the coating, providing easy, low cost maintenance.

Additional Protection/Application Functions

- Rust Bullet can withstand temperature at 325 deg C with 72 hrs continuous with no visible degradation.
- Rust Bullet has a fire spread index of 0 and smoke develop index of 5. Rust Bullet is capable to retard fire.
- Rust Bullet is approved by EPA USA for coating drinking water storage or carry equipment.
- Rust Bullet is tested and field proven it can resist fungus and similar micro or macro growth.

Benefits of using Rust Bullet

- Longer life for Equipment – By protecting the metal with all existing corrosion protection technologies, it will ensure longer serviceability of the equipment
- Safer Equipment – By protecting equipment with a Rust Bullet Coating the structural integrity of equipment will be maintained and thus safer.
- Value Retention – Equipment maintained in a corrosion free condition will retain a higher value
- Functionality – Equipment with proper maintenance schedules will perform at a higher standard

Reduce Maintenance Cost & Down-Time

General Commercial Application Procedure

• **Very Simple Application:**

- Minimal surface preparation.
 - Remove only loose rust flakes and loose existing paint
 - Remove oil, grease and dirt.
 - Sand surface slightly with grit #120 sand paper.
- No primer required, apply directly on corroded surface or existing paint.
- Apply RUST BULLET® with 3 or more layers depending on desired protection period required and corrosive conditions.
- If special color (other than grey, black) is desired regular commercial paints can be applied on the final layer after final coat is dry.
- Simple repair of coatings in case of accident or mishaps:
 - Just repaint the damaged place with RUST BULLET®. It means simple maintenance.

Where do apply Rust Bullet

- Rust Bullet can be applied on any metal (corroded or non-corroded surface)
- Concrete
- Wood
- Ant solid surface

