TANIK CHEM SPRL BVBA

WHAT IS TANIK +

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WHAT IS TANIK+ ?

TANIK+ a result of 15 years of research, represents a new technology in the corrosion control sciences.

TANIK+ is a treatment for rusted steel before painting : it neutralizes the corrosion process. It reacts quickly with rust and transforms iron oxides and hydroxides into a stable and insoluble blue-black metallo-organic complex which is ready for painting after reaction.

TANIK+ is thus a water reducible chelating polymer which bas been designed for field application to rusted steel which bas been hand or power cleaned, or sandblasted.

In fact, **TANIK+** transforms at the atomic level, the "rust" molecules in a new chemical substance (a metallo-organic complex) which is completely neutral, avoiding any further rust to be formed.

TANIK+ is a rust transformer and stabiliser not a rust remover.

TANIK+ is compatible with most of the primers and paints, except zinc rich primers which need to be in contact with bare pefectly cleaned metal to get a good reaction.

PR0PERTIES AND ADVANTAGES 0F TANIK+

TANIK+ peforms a thorough chemical passivation of the substrate and makes it a sound base for the application of coating systems.

TANIK+ offers many advantages :

- Penetrates directly into residual rust even in pitts or crevices, neutralising it into a 100% stable metallo-organic complex.
- Requires minimal surface preparation.
- Reacts in only 3 hours.
- 0ne coat, without excess, is sufficient.
- High coverage : 25 square meter per liter.
- No rinsing or other post application.
- Non flammable (flash point over 212°F).
- Non toxic.
- Environmentally safe.
- May be applied on wet surfaces.
- May be applied from +1°C to 40°C. Special formulations have been developped for application in hot and dry climates
- Poor sensitivity to the humidity degree.
- Excellent base for paint
- Easy to use, may be applied by brush, roller or spray.

- Money saver :
  - Costs only a few cents per square foot ($0.05 - 0.06) or $1/sq.m.
  - No skilled manpower needed.
  - No special equipment needed.
  - No special protection for the other surfaces which do not need to be treated.
  - Extends the coatings lifetime by at least 100% .

TANIK+ AND THE PAINT SYSTEMS

TANIK+ is not a paint.
The **TANIK+** treated surface must be protected by a suitable paint system.

Most metal protective paints can be used over TANIK+ :

- **Industrial Maintenance** :
  Alkyd systems, modified alkyds, chlorinated rubber, epoxy urethanes, vinyls and the new water borne systems.

- **Touching up Car Bodies** :
- Alkyds ("synthetics"), nitro-cellulose, acrylics.

- **Building Industry** :
- Alkyd systems.

DIRECTIONS :

- Types of paints and the number of coats needed will be determined by the aggressiveness of the environments.

Note : **TANIK+ and water borne paints.**

Vinyl acrylic copolymers are used for making water borne paints which will protect steel in aggressive industrial conditions.
These paints are economical and safer being water based.

However, such water based paint systems will not give full protection when applied on a steel surface which is not entirely rust free or of which any rust has not been **neutralised**.

Moreover, **TANIK+** also allows to avoid the disadvantages of the flash rust caused by these water based coatings when applied to hand cleaned or sandblasted steel.

A pre-treatment with **TANIK+** before painting will improve considerably the durability of water based paints. **TANIK+** enlarges thus, tremendously the opportunities of using with success, these water based paint systems.

COMPETITION

TANIK+ competes with other **techniques.**

A. Sandblasting
B. Rust Removers
C. Anti-Corrosive Primers and Paints

A. Sandblasting

Blast cleaning the surface to white metal is the best method as surface preparation.
But :

- It is expensive : Cost varies between $1.50 - 2.50 per square foot ($16.-27/sq.m.).
  Applying **TANIK+** costs only a few cents per square foot ($1/sq.m.).
- Flash Rust : The freshly exposed surface is highly reactive and bare metal exposed to atmospheric humidity wi11 rust quickly if not topcoated immediately (i.e. within 4-6hours).
- Environment Protection - Regulation.
- Inconvenience of rigging.
- Dust and spark potential.
- Limited size of areas to be cleaned.
- Difficulties of arranging blasting/painting cycles, etc.
- Ski11ed manpower.

B. Rust Removers

Usually, acid-based products.

Phosphoric acid. (OSPHO type).

They have shown limited advantages in relieving the problem :

- Reaction are not homogeneous : Rust cannot be defined by one single formula.
  These products are not able to bind both the divalent iron and the trivalent iron at the same time. As the rust is often made by the superposition of several layers of different chemical composition, these products are unable to effect a satisfactory passivation of the surface.
- Field conditions : Removal of the rust is extremely difficult under temperature, concentration and application conditions existing under field conditions.
- Residual acid salts : In many situations, residual acid salts left in the pores of the rust bave caused failure by osmostic blistering.
- Strong acid : Health and environment problems.

Sulphuric acid and hydroch1oric acid :

- They are pickling agents and since iron chlorides and iron sulphates are water soluble salts, these acids may not be considered as rust converters. Furthermore residual chlorides and sulphates can cause further rusting of the metal.

C. Anti Corrosive Primers and Paints

Today, the trend in corrosion treatment is to abandon the ideas of applying a product able, at the same time, to neutralize rust and to protect the metal. More and more, researchers have made a distinction between **surface preparation** and **protective coating**. The efficiency of the modern coatings depends more and more on the surface preparation. This is why **TANIK+** has entered the market at the right time.

TANIK+ competes with other **products** belonging to the same family.

A. Resin Latex based coatings (type Extend, Neutra Rust, ...)
B. Chesterton

Principle : All these products use tanic acid to generate a chelation (linkage of iron at the atomic level), which will transform the rust (iron oxides) in a metallo-organic complex (ferri-tannic complex).

A. Resin Latex Based Coatings :

In these products Tanic acid and solvents have been added. Basically, they are a protective coating with "addition" of chelating agents.
Because of the particular chemical composition of these products, the chelation must be poor. Usually manufacturors suggest at least two coats : it is an ineptitude, if the first goal is to passivate the rust. The product once applied, the reaction with the rust has occured, as there is no more rust, it is absurd to apply a second coat.
This shows that these products operate more as a primer than as a rust transformer. As it can be seen on our salt spray test panels, the results are poor. Moreover, most of these products have poor coverage.
Most of them also have humidity limitations. Most of them also are flammable, toxic and have strict temperature limitations. Some of them have to be rinsed before painting.

B. Chesterton :

It is a real rust transformer, very close to the former **TANIK**.
Meanwhile, it belongs to the former generation of rust inhibitors.
The reaction time is long and it is necessary to rinse to eliminate the excess of the non reacted product.
Moreover, it is flammable and toxic. Also it has strict temperature and humidity limitations.

THE MOST COMMON QUESTIONS AND OBJECTIONS

Expensive : more than $85 per US gallon ($23/L)

It is not a "volume" or a "weight" which is sold, but a "treated surface".

The coverage of a primer or a paint is about 300 square feet a gallon.
TANIK+ coverage is 1000 square feet per gallon (or 25 sq.m./L.) : that means $00.85/sq. ft ($0.9/sq.m.); which is very cheap to prepare the surface, especially y if you compare with sandblasting.

- Light sandblasting : $0.40 - $0.6 a square foot
- White Metal sandblasting : $1.50 - $2.50 a square foot

Let us take an example :

Surface to be treated : 3,000 square feet.

1. Cost of White Metal Sandblasting $1.50/square foot — $4,500
   This includes labor and material

2. Surface preparation with **TANIK+**

   Hydroblast : $0.20/square foot : $600

   TANIK+ - labor : 1 man, 1.5 hour,
   $10.00/hour 15

   Material : 3 gallons
   $85/gallon 255

   Total — $870

   SAVINGS : $4,500 - $870 = **$3,630**

I use to sandblast, because it is the best solution.

It is true.

But :

- What happens if the activated metal could not be painted immediately after sandblasting. The freshly exposed surface is highly reactive, and rust will reappear after a few hours. The difficulty of

arranging blasting/painting cycles can be solved economically by neutralizing the freshly formed rust with **TANIK+** before coating.

- When the entire surface is not flat, but is studded with bolts, screw-nuts, clinches, seams, it will be impossible to remove all the rust around, or above these elements. Applying **TANIK+** on thesespots will avoid continuation of the corrosion process.

- Nearly always, there are spots not easily accessible where sandblasting is impossible or inefficent. Applying **TANIK+** may solve the problem.

Conclusion : **TANIK+** is the best alternative where sandblasting is ruled out due to the cost, environment protection, inconvenience of rigging, dust and spark potential, limited size of areas to be cleaned, difficulty of arranging blasting/painting cycles, etc...

I use phosphoric acid and I am satisfied.

It is a widely used method.

But :

- If there is a thick rust, made by the superposition of several layers of different chemical composition, phosphoric acid is unable to effect a satisfactory passivation of the surface. The reaction could not be homogeneous. (see technical brochure, page 1 & 2 - competition - rust removers).
- Field conditions may not allow the use of phosphoric acid. (see competition - rust removers)
- Residual acid salts may cause failure by osmotic blistering.
- In many areas (like engine rooms for example) phosphoric acid cannot not be used.

Conclusion : Once again **TANIK+** is the best alternative or complementary treatment everywhere the use of phosphoric acid is proving impossible, dangerous, prohibited or inefficient.

The TANIK+ competitors are cheaper.

We bave to compare **efficiency**, **coverage** and **advantages**.

- **Efficiency** : Without any doubt, **TANIK+** will get the best results.
  All our tests prove that **TANIK+** outperforms the competitive rust stabilizers by a large margin.

But even if **TANIK+** was not better :

- **Coverage** : **TANIK+** has the higher coverage : 1000 square feet/gallon vs. 200, 400, 800.
  (25sq.m./Liter).

- **Advantages** : 3 hour reaction time only (after which the first coat can already been applied).
one coat only
no rinsing.
no sandpapering.
non flammable.
non toxic.
wide temperature and humidity range.
special formulations have been devellopped for extreme weather conditions (hot an dry climates, high surface temperature (up to 80°C).
any paint system is compatible with **TANIK+.**

Using TANIK+, do we need to use a Primer ?

May we use a paint of lower quality ?

May we apply one coat instead of two coats ?

TANIK+ is **not** a coating, it is a surface **preparation treatment**.

TANIK+ "rebuilds" a quality surface very close to the one of a brand new piece of metal free of rust. Therefore, the paint system to apply is **the same** as what should have been applied on unrusted metal. **TANIK+** stops the continuation of the corrosion process under the paint film subsequently applied. In itself, **TANIK+** is not a protective coating. This is the role of the paint system.
TANIK+ will extend the life of the paint system because it stops the corrosion under the paint film. Once the topcoat has deteriorated, **TANIK+** is unable to serve as a substitute for the paint system. If it was the case, it would not have been necessary to paint over it .

Is it better to brush or to spray ?

If the layer of rust is thin, you may spray. If the layer is thick or the surface uneven, brushing would be better, to get a maximum penetration.

May we apply two coats of TANIK + ?

NO.

When **TANIK+** has reacted, all the rust is neutralized. If a second coat is applied, no reaction will occur, as there is no more rust.

Is it better to apply a thick coat ?

NO.

TANIK+ reacts in depth with the rust; it penetrates directly into the residual rust. One coat without excess suffices. Avoid letting the product run off over the surface.

May we apply TANIK+ on bare metal, free of rust ?

SURE, you can.
TANIK+ will react on bare clean steel also providing a sound passivated steel base for further coatings.
TANIK+ may also be applied on surfaces which are only partially rusted or on a superficial rust such as the one which may form after sandblasting.

Is TANIK+ reacting with other metals ?

NO.

TANIK+ reacts only with rust (iron oxides/hydroxides). Do not use **TANIK+** to cure corrosion of alumimum, copper, etc.

How long could we wait before painting after applying TANIK+ ?

Paint must not be applied during the reaction of **TANIK+** with the rust. Reaction time is three hours. It is recommended that the top coat should be applied within 48 hours in a corrosive atmosphere. In a non corrosive atmosphere, the top coat should be applied within 10 days.

May we apply TANIK+ on old paint ?

Not on deteriorated paints, obviously.
But, when a surface is hand cleaned, spots of old paint remain on the surface.
TANIK+ may be applied on these spots. **TANIK+** will dry, but not react. The loss in adherence with subsequent paint is insignificant.

Is it absolutely necessary to "prepare" the surfaces before applying TANIK+ ?

TANIK+ must be applied like any other coating, on a physically cleaned rust.

No product whatsoever will adhere to a surface which has not been cleared of mill-scale, rust chips, loose rust, blisters, deteriorated paints, greases, etc...

What is the temperature resistance ?

7 day resistance tests were made at a temperature of 500°F (260°C). The protective coat remained unchanged throughout the tests.

May we apply TANIK+ on a surface which has to remain in continuous immersion ?

You found the weak side of **TANIK+** .
TANIK+ belongs to the family of the polymers. And, as a polymer, permanent immersion (i.e. under water level) causes blistering.

It is a good reason not to stop the researchers.
TANIK+ may still be improved.

May me apply TANIK+ on surfaces which will be wet most of the time ?

SURE, you can.

Many surfaces, although not located under the waterlevel are wet most the time because of frequent rain, splashes etc..., such as ship superstructures. **TANIK +** finds here one of its large application fields.

May we apply TANIK+ on surfaces exposed on pollution or corrosive atmospheres ?

SURE, you can

Insdustrial areas, chemical plants, ports and coastal areas are all typical areas where TANIK+ is widely used as it inproves steel protection against aggressive air pollutants. But always apply a good quality paint system appropriate to the actual location of the constructions.