



# JOTUN

Jotun Protects Property

## YOUR GUIDE TO TANK LININGS







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# WHY SHOULD YOU LINE YOUR TANK?

## Day-to-day maintenance.

With the many demands of running a processing facility, taking time to consider coating the inside your tanks might not seem like something that should be a priority. However, if it is not considered, the impact to the profitability of the facility can be significant – with your end product compromised, potentially reducing production capacity, and in extreme cases potentially even shutting down a facility.

## Here are two of the main reasons to line your tank:

### 1. Product protection

In any kind of processing facility, it is critical that the quality of the chemical stored in your tanks is not compromised – whether that is your raw materials or your final product. If either is contaminated, either by rust or a previously stored chemical, your profits will usually be impacted.

It is therefore important to protect your products with an appropriate lining inside your tanks. This will help ensure they don't become contaminated with particles from the tanks themselves or their previous contents.

### 2. Maintain facility efficiency

In extreme cases, tanks can fail if they are not protected from the chemicals inside. This can happen if there is no lining, if the wrong lining has been selected or if the lining has not been applied properly.

In the worst-case scenario, an unplanned shutdown is required to do maintenance on the affected tank before production can resume.

In any shutdown, time is at a premium with costs potentially running up to \$12 million for every day that it is not operational – so every minute counts.

Therefore, choosing a coating that can protect both your tank – ensuring it remains safe and operational for as long as possible – and its contents, is vital.

Find out more from our video [here](#)



# WHAT ARE YOUR TANK LINING OPTIONS?

It is important when selecting a lining that you choose one that has the correct chemical resistance to be used with the stored contents of your tank, providing the required protection to ensure the quality of your product is maintained.

At Jotun, our tank linings can be broadly split into three generic types of chemistry; epoxies, vinyl esters and zinc silicates.

## 1. Epoxies

Epoxy linings, such as Tankguard SF, Tankguard Plus and Tankguard Storage, offer the **widest chemical resistance** and **best temperature resistance** of the three types.

Depending on the specific product and epoxy chemistry, these linings are able to protect from pH 3 to pH 14. Epoxy coatings are typically used in tanks storing biofuels, petroleum products, water, alkaline solutions or vegetable and mineral oils.

Epoxies also offer you the **flexibility** to change the product stored in your tank as it is less porous than other coatings. This makes it easier to clean, allowing you to change the contents with a lower risk of cross contamination.

Solvent-free epoxy linings can be applied using a wet-on-wet application, this means two applicators can be working at the same time, applying one layer on top of the other without having to wait for it to dry. Meaning the lining can be applied up to 50% faster, ensuring tanks can be returned back to service faster.

## 2. Vinyl esters

Vinyl ester linings, for example Chemflake Special, are typically used to **store acids**, such as hydrochloric or sulphuric acid, biofuels or aggressive chemicals and can be used to protect against pH 0 to pH 9.

Vinyl esters also **cure very fast** and allow you to get your tanks back into service quicker after application.

## 3. Zinc silicates

Zinc silicate linings, such as Tankguard Zinc, provide **excellent protection for alcohols, solvents and potable water**. Zinc silicate linings can withstand almost all chemicals between pH5.5 and pH10.

Since zinc silicate tank linings are **applied in a single coat**, they can provide time savings of up to 60% compared to an epoxy tank lining.

More information is available in video format [here](#)



# WHAT ARE THE ALTERNATIVES TO LINING YOUR TANK?

**When it comes to protecting your tank and its contents the questions you need to ask yourself are:**

- What do you need to protect your tank and product from?
- What is the most commercially viable option?

If you have a large tank, it usually makes most commercial sense for it to be carbon steel which costs seven times less than a stainless steel tank. As a result means the tank, and its contents, should be protected with a lining.

If you have a smaller tank there can be more options. Some of these include; Stainless Steel and GRP – Glass Reinforced Plastic/ Polymer tanks.



## **Stainless steel**

Stainless steel is resistant to most chemicals and products and typically does not require a lining.

The reason it is not more widely used is it is a very expensive material when compared to carbon steel with an appropriate lining. Stainless steel tanks are also more challenging to construct, both due to the hardness of the material and due to restrictions on materials used when welding and heat working. Not only is the stainless steel material itself more expensive than carbon steel, but the labour cost and time will increase when building a stainless steel tank. It is imperative to have highly qualified personnel doing the construction of the tank to ensure a properly constructed and well-functioning tank. The advantage of stainless steel tanks is that they are resistant to more or less any chemical, with halogens being the most common exception to the rule.

## **GRP – Glass Reinforced Plastic/Polymer tanks**

GRP tanks are most frequently used for water tanks, however certain types of plastic are resilient to acids and, providing your tank is small, there are some GRP tank options that are available.

These are more expensive than carbon steel but don't require coating, however it is crucial to ensure that the correct quality of plastic or polymer is used to ensure the tank survives for the intended lifetime. Typically, a GRP tank can only be used to store the chemical it was originally designed for, offering more limited flexibility in the use of the tank.

As with all tanks and their contents, it is important to ensure they will be adequately protected. Please check with your supplier before storing anything in your tank.

Find out more from our video [here](#)

# THINGS TO CONSIDER WHEN LINING YOUR TANKS

To ensure you get the maximum storage capacity from your tank, and avoid product contamination, it is important to ensure you are choosing the correct tank lining.

## Points to think about in advance are:

- The product you will store in the tank and its chemical make up
- The temperature the tank will be kept at (it may not be consistent across the tank)
- The pH level of your product
- The frequency of use/change of the stored product
- The size of your tank
- The ambient condition – strong sunlight can increase the internal temperature of the stored chemical, and icy winters can give large temperature gradients and a cold-wall effect.
- Speed - does it meet timeline goals? Is it efficient?



If you choose the wrong lining for the products being stored in the tank it can blister or flake. In this case it will fall off and can end up in the pumps or filters. If this happens, it can impact operations at your facility while the coating is removed.

Even worse, it could impact your ability to sell your end product. Take Jet A-1 fuel for aircrafts for example. If an approved lining is not used in the storage of this product, it can't be sold to the airline, as there are strict safety regulations when it comes to the quality of the fuel used for aircrafts to ensure aviation safety.

The best solution is to speak to your coating supplier to ensure you get the best lining to suit your needs, both technically and commercially.



# HOW TO GET THE BEST OUT OF YOUR TANK LINING

Once you have selected the correct lining for your tank, there are a number of things to do to ensure you get the best performance from your lining, ensuring it lasts as long as possible. These simple steps will maximise the performance of your chosen tank lining.

## 1. Application and surface preparation

Whatever tank lining you select it is vital it is applied properly. If the application or surface preparation is faulty, no matter what coating you have, it will not perform as designed and likely not meet the expected performance.

## 2. Empty tank

This may seem obvious but the tank must be completely emptied of product and gas in order to make it safe to carry out the application. This includes ensuring that the atmosphere in the tank is breathable, as CO<sub>2</sub> and other noxious gasses can quickly build to lethal concentrations inside the confined space of a tank. Having a good plan for emptying the tank and ventilating it is crucial to ensure the safety of your workers. This process is very important and carries a high risk, as failure to carry it out correctly could ultimately result in death, it is critical that all procedures should be carried out correctly.

## 3. Blasting and cleaning

From a tank lining perspective, this is one of the most critical steps of the process. It is vital to ensure no dirt, foreign bodies, remnants of the previous coating or previous contents remain on the internal tank walls when the new lining is applied.

To carry out the cleaning, the team will stage up inside the tank and blast the internal walls to remove all waste.

After blasting and before the coating is started, it is critical to thoroughly vacuum and clean the tank to remove any particles dislodged during the process.

Using dehumidification equipment, DH, is a very efficient way of holding the blast of the tank. While it might be considered an additional expense, it is well worth considering to ensure the best final result when it comes to lining integrity and tank performance.



# HOW TO GET THE BEST OUT OF YOUR TANK LINING

## 4. Lining

Once the blasting and cleaning are complete, it is time to start lining the tank.

The first section the applicators will work on is the walls, using the staging already erected for the cleaning process. Once complete, the staging will be removed and the floor will be blasted and coated, with the applicators working their way out of the tank. This is the most commonly used approach to lining a tank.

If your applicators are experienced, they can complete the floor while the walls are still drying, which gives you a tank that is well coated and back into service faster than if you have to wait for the walls to dry.

When coating the tank, it is important to have good ventilation and air flow. For solvent-based tank linings, the solvent evaporates during the curing process. If there is insufficient ventilation during the curing, the solvent will be unable to evaporate, and this can compromise the final quality of your tank lining.

## 5. Faster back to service

We know that every second counts during any shutdown, whether it's planned or unplanned, so it's critical to get your tanks back into service as quickly as possible.

The challenge with a lot of coatings is that after the first coat, the drying time can be up to three days before you can safely apply the second coat.

If your shut down is costing up to \$12 million every day, this is an unacceptable timescale.

**Wet-on-wet application** can help with this. If you are coating your tank with a truly solvent free tank lining, you can have two applicators working in synchronisation inside the tank.

As the first applicator is working through the tank applying the first coat, the second applicator can follow 20 - 30 minutes behind, applying the second coat. Once the walls are coated, you can apply the floor at the necessary wet film thickness (WFT) since there is no risk of sagging, and then your coating job is done. By using this method, you receive the safety of a two-coat system – avoiding holidays, pinholes and low dry film thickness (DFT) – with the speed of a one-coat application.

Things to keep in mind when doing wet-on-wet application is to use a truly solvent free tank lining, and to ensure that your fastest applicator goes into the tank first to ensure the second applicator is not waiting on the first.

Tankguard SF, Jotun's solvent free tank lining, can be applied wet-on-wet and allows you to return back to service faster, without compromising on chemical resistance.

Find out how this is possible by viewing our videos [here](#)





# THE INDUSTRY JUST GOT QUICKER. ABOUT TIME.

**At Jotun, we have been supporting customers in lining their tanks for more than five decades.**

Our rigorous testing and years of experience in the field mean you can feel confident our products and expertise will give you up to 50% faster tank lining application, returning your tanks to service quicker than ever before.

Get faster with your tank linings.

## ***Tankguard***

STORAGE

PHENOLIC EPOXY

Getting your clean petroleum product and crude oil tanks back into service within 48 hours.

## ***Tankguard***

PLUS

NOVOLAC EPOXY

Up to 50% faster than competition, for 95% of storage tanks.

## ***Tankguard***

SF

SF NOVOLAC EPOXY

The benefit of two solvent-free coats in the time one.

## ***Tankguard***

ZINC

ZINC SILICATE

The best solvent resistance: 60% than an epoxy coating – no mudcracking.

## ***Chemflake***

SPECIAL

GLASS FLAKE VINYL ESTER

The fastest lining for acid storage tanks.



To find out more about Jotun's TankFast tank linings, and how to get your tank faster back to service, visit the website or contact Kevin.

**[kevin@jotun.com](mailto:kevin@jotun.com)**

**[www.jotun.com/tankfast](http://www.jotun.com/tankfast)**