



Presents

Frequently Asked Questions

**Questions and answers dealing with
Plaforization™, Plaforization Plus™ and Toran™ -
the one-step, room temperature,
no sludge, and no waste systems for degreasing and
phosphating of metal surfaces.**

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PAI-KOR PLAFORIZATION™ AND TORAN™

FREQUENTLY ASKED QUESTIONS

Q1 I have heard and read a little about PlafORIZATION™, but give me a little refresher. And what are PlafORIZATION Plus™ and Toran™ and how are they different from PlafORIZATION™?

The PlafORIZATION™ process was developed in the 1970s in Italy and is now in use world-wide. PlafORIZATION™ is a truly one-step organic phosphating process for preparing metal for painting. It operates at room temperature (no heat at all) and is not rinsed, uses no water, and creates no waste.

PlafORIZATION Plus™ and Toran™ were developed out of the PlafORIZATION™ technology, and operate on the same principles. PlafORIZATION Plus™ is added to an existing PlafORIZATION™ system to greatly improve adhesion (passes very difficult tests such as boiling water). The new Toran™ generation of products goes even further, revolutionizing the bonding of the sealant to the metal. It not only improves adhesion like PlafORIZATION Plus™, but in addition gives much greater corrosion resistance and impact resistance beyond the already impressive levels associated with PlafORIZATION™. And both chemistries are extremely stable, so your results are consistent day to day and month to month.

Q2 I've heard that PlafORIZATION™ cleans and prepares metal surfaces for coating in a single step at room temperature, and that there is no need to periodically change the chemicals. It really sounds too good to be true. But after a certain period, oils will accumulate in the bath, right?

With PlafORIZATION™ (including PlafORIZATION Plus™) and Toran™, you can clean and seal metal parts in a single step using a single product, and there is no need to periodically change the chemicals. PlafORIZATION™ and Toran™ work indefinitely, without the need to change the bath or dispose of oil or any other effluent, so long as the metal surfaces have no more than 14 gm/100 ft² of oil on them.

Q3 What if, by mistake, I treat a few parts contaminated with more oil than the limit?

The limit of 14 gm/100 ft² means only the average amount of oily contaminants per ft². Generally, the oil contamination level on cold rolled steel is between 2 and 3 grams per 100 ft², so you can see that the process is actually able to treat products with oil levels four times higher than normal on average.

While PlafORIZATION™ and Toran™ are limited to absorbing a maximum of 14 gm/100 ft² of oils on the surface of the metal being treated, components contaminated with a higher oil level can be treated by adopting the following procedure. If for a short period, 20% of the metal being treated is likely to be contaminated with 28 grams of oil per 100 ft². (i.e., twice the normal maximum permitted level), and if the remaining parts are contaminated with only a normal oil level, the average oil contamination would still be within the polymer's maximum absorption range, so there would be no problem.

In other words, if the percentage of components heavily contaminated with oil can be balanced against a similar or greater percentage of components with normal oil levels, then this will hold the oil in the bath at an acceptable level.

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Q4 You said that your special polymers are capable of absorbing the oily contaminants. Is that correct?

Yes, our chemical formulations are based on special polymers that incorporate and combine with the oils. To better explain, the oily and fatty contaminants are captured and removed from the tank on the treated parts, where the special polymers absorb the oils and trap them in a three-dimensional macromolecular structure. They are therefore not left in the tank to form waste.

Q5 That means that the oils remain on the metal surface, if I understand correctly. If so, how will paint adhere to the surface of the metal?

The oils on the metal surface are not "free oils" but are chemically captured and therefore cannot interfere with adhesion. They cannot migrate to the surface even during curing. A metal surface treated with PlafORIZATION™ or Toran™ is completely capable of receiving finishing products. In fact, the oils improve adhesion of the topcoat because they function like a plasticizer in the polymer, giving it great flexibility and making the coated part extremely resistant to cracking and chipping.

Q6 Is there a relationship between production throughput and bath volume?

Yes, the ability of the process to treat metal substrates efficiently depends upon its capacity to absorb the oily contaminants without becoming saturated. Basically, it is sufficient to size the treatment bath to the production throughput in order to ensure that the "saturation point" is never reached in the bath.

Q7 You said that PlafORIZATION™ and Toran™ work only when oils average less than 14 grams/100 ft². Does this limit apply to all kinds of oils?

PlafORIZATION™ and Toran™ work with most mineral lubricants available on the market. We recommend against using silicone-based oils, strong alkaline or strong acid oils, water-emulsified oils (if they are not dry), and especially certain stearates and high-melting-point waxes.

Q8 The fact that water-emulsified oils present some process issues sounds like a serious limitation!

Not so! Many industrial PlafORIZATION™ plants treat metal sheets previously contaminated by water-emulsified oils. As you know, PlafORIZATION™ and Toran™ are not compatible with water, so these users simply evaporate any water before proceeding with PlafORIZATION™ or Toran™ pretreatment.

Q9 You said that PlafORIZATION™ and Toran™ degrease metal surfaces, and you told me where the oils go. But what about solid impurities? Is simple immersion in your chemicals effective in removing these particles?

All PlafORIZATION™ and Toran™ dip tanks should be provided with some form of agitation such as mix-jets or eductors so turbulence is created to help remove solid impurities.

Q10 Can ultrasonic transducers be used to create the turbulence?

Most definitely.

Q11 Where do solid impurities go?

Solid impurities are filtered by a simple bag filter unit and removed continuously from the bath.

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Q12 What happens if some metal components fall into the tank?

We recommend installing a retrieval false bottom. You can lift out this tray and remove the fallen articles, as well as those large solid impurities that cannot be handled by the filter unit. If some iron particles accumulate in the tank, another effective method is to retrieve them with a magnet dragged along the bottom of the tank.

Q13 You said that there is no need to change the bath, but it is still not clear to me how the process works. For instance, do I have to rinse the parts after Plaforization™ or Toran™ treatment?

Absolutely not. Plaforization™ and Toran™ are both water-free processes. The treated parts should be placed in a drain station and then in a blow-off station.

Q14 Is it necessary to oven-dry the treated parts before proceeding to the paint booth?

It depends on the type of Plaforization™ or Toran™ process used and on the characteristics of the parts to be treated. Some of our organic pretreatment formulations can be dried at room temperature, while others require oven drying.

Q15 You said that parts treated with Plaforization™ or Toran™ must be put into a drain station and into a blow-off station. Can you better explain the purpose of these stations?

The drain station allows for recovery and recycling of the liquid dripping from the parts. The blow-off station has a two-fold advantage. For air-drying applications, the air blown over the parts reduces the drying time. For both air-drying and oven-drying applications, the blow-off eliminates any excess treatment liquid, thereby minimizing the over-use of chemicals.

Q16 Can you tell me something about the phosphating reaction? What is the size of the crystals? Can you show me a photograph of the phosphated surface?

Here is where Plaforization™ and Toran™ differ most from each other in terms of chemistry.

With Plaforization™ (including Plaforization Plus™), a metal conversion is produced by deposition of a thin layer of inorganic phosphates created from the substrate metal, sealed by the polymer polyphosphate. Toran™ does not use phosphoric acid at all, and the resin is specially designed to bond directly to the cleaned metal surface.

With Plaforization™, where a phosphate “bridge” is present, the presence of the polymeric phosphate sealant makes it impossible to get any meaningful picture of the phosphate layer. Plaforization™ is a different technology and cannot be compared to conventional water-based phosphating systems using physical and chemical parameters adopted for the conventional technology.

Q17 You said that Plaforization™ deposits an inorganic phosphate plus a polymer seal, so I presume that it performs better than iron phosphate. Is that correct?

Yes. A zinc phosphate layer is created during treatment of zinc-coated steel, while with steel, iron phosphate is deposited. Performance is better than the conventional iron phosphate processes and, in theory, slightly inferior to the conventional zinc phosphating process. However, in practice, Plaforization™ often performs better even than zinc phosphating because conventional pretreatment systems easily become out of balance and do not perform optimally, whereas Plaforization™ is extremely stable chemistry.

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Q18 If Toran™ does not deposit any inorganic phosphate, does that hurt its performance characteristics?

No! On the contrary, adhesion, corrosion resistance and impact resistance are actually greatly improved, because the elimination of the "bridge" phosphating that occurs with Plaforization™ makes the bond to the metal significantly stronger. The polymer is different than that used in Plaforization™ products and makes a very strong chemical bond directly to the metal surface without the need for etching and phosphating.

Q19 You spoke about zinc-coated steel. Is it possible to treat steel sheets and zinc-coated steel in the same solution?

Yes. You use a single solution to treat steel, cast iron, zinc-coated steel and even aluminum. There is no need to use different baths for these operations.

Q20 That's very interesting. What happens on aluminum surfaces?

Aluminum, of course, does not accept a conversion coat unless phosphate chrome is used. With Plaforization™, the aluminum will still receive an etch that will give excellent adhesion. And aluminum surfaces are then covered with a highly flexible organopolymeric sealant which further improves both the adhesion and mechanical properties of the finishing products.

With Toran™, the seal is made directly to the aluminum surface, as with all metals you would be treating. The etching is not necessary at all.

Q21 On some of my steel components I need to get more than 500 hours of salt spray resistance? Can I use Plaforization™ or Toran™?

Absolutely—depending, of course, on the quality and thickness of your topcoat. Plaforization™ is designed for the mid-range of salt spray resistance, better than iron phosphate. Toran™ provides significantly higher performance than the Plaforization™ line.

Q22 In any case, if I understand correctly, it is not possible to replace chromic passivation with Plaforization™ or Toran™. Is that correct?

That's right.

Q23 After preparing the metal surface, I intend to coat with an epoxy-polyester powder coating. Any problem?

No problem. You can use most coatings available on the market, including wet paints (solvent-based and water-based) and powders. When using pure polyester powders based on TGIC (triglycidyl isocyanurate) and using Plaforization™ products, it may be necessary to raise curing temperature 15 to 20 degrees F.

Q24 What happens if I have to wait for a couple of days before coating my parts treated with Plaforization™ or Toran™? Do they get rusty?

They do not rust. Another great advantage of Plaforization™ and Toran™ is that they give excellent temporary protection against corrosion to unpainted treated surfaces. If you store the parts indoors on premises with normal humidity levels, you can wait for weeks before painting.

Q25 Can I treat rusty surfaces with Plaforization™ or Toran™?

If you have only light spot rust, yes. Otherwise you should remove the rust before proceeding with Plaforization™ or Toran™ since our chemicals are not rust removers.

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Q26 I need to treat some parts by e-coat paint application. Can I do that?

Yes. The polymeric seal of the Plaforization™ and Toran™ processes is very thin, about 1 micron, and the electrical charge required for e-coat penetrates it in the same manner as with powder coating. Care must be taken to drip/blow off parts to ensure even application of the polymer. As always, the process should be tested as part of the evaluation.

Q27 Let's come back to bath performance and stability. You said there is never any effluent. But what about by-products created by the chemical reaction? How often is it necessary to de-sludge the bath?

The answer is NEVER. Plaforization™ is not a conventional phosphating process, so the chemistry of the process is quite different. The Plaforization™ reaction does not create any by-products, so there is no precipitation of sludge in the baths.

Q28 This is beginning to sound like an interesting product. You said that there is no need to change the bath, ever; that there is no effluent, ever; that I can treat steel, zinc-coated steel and aluminum with the same solution; that it works at room temperature, etc. It sounds like a really great product and I would like to install an organic pretreatment line, either Plaforization™ or Toran™, to treat my parts.

Toran™ does not use phosphating in its process, and also creates no waste by-products.

Great! Can you give me an idea of your production needs for this installation? We should get some basic information from you about production throughput, size of parts, number of shifts per day, whether you are looking for a dip or spray (flowcoat) operation, which product line best fits your needs in terms of corrosion, adhesion and impact requirements, and whether you would prefer an inline or batch system.

Q29 Now I need some information about the installation. First, are you going to design the project for me?

Not directly. Our mission is the sales and service of chemicals for the surface treatment industry, and we devote our time and energy to that task. However, our representatives can assist you in designing your installation. They can provide you with a turnkey system, or they can review your design so you can build your own.

Q30 By the way, you mentioned follow-up service and I forgot to ask you about analytical controls. Do we have to perform daily analytical controls of the bath?

Plaforization™ and Toran™ are very simple technologies that take the chemical mystique out of the pretreatment process because no chemical knowledge is necessary. A Plaforization™ or Toran™ system is simple to maintain since no daily or weekly checks are necessary and users need only provide a sample from their tank for periodic analysis performed in our certified laboratories. Generally, the only monitoring required is an analysis of the liquid in the tank every 3 months. In any event, if clients wish a more frequent check, a detailed control procedure is available and simple "checks" can easily be performed by users in the plant. These checks can be made daily or weekly depending upon the user's requirements.

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Q31 Coming back to the installation, I only have limited space available in the factory. Therefore, I think we should design a simple in-line conveyorized automatic plant. Do you recommend a dip or spray plant?

That really depends on the available space, but you can do either one depending on your process needs.

Q32 Your literature refers to the spray application as “flowcoating.” What do you mean exactly by flowcoating?

We’re referring to a spray process in which liquid is sprayed over the parts at a very low pressure (maximum 3–5 psi).

Q33 Are Plaforization™ and Toran™ really room temperature processes?

Yes. You do not heat the solution to operate with it.

Q34 I would prefer the flowcoating process, but I would like to get your proposal for a dip plant too. Can I use Plaforization™ or Toran™ for a dip application?

Yes, they can also be used for dip applications.

Q35 How long is the treatment time with Plaforization™ and Toran™?

Metal surfaces must remain in contact with the liquid for 60-90 seconds, and then you proceed with drainage, blow-off and final fluid flash-off. As discussed, drainage and blow-off are extremely important because in these two stations a significant amount of liquid can be returned to the feed tank and reused. Draining time and blow-off time depend on the conveyor speed and the shape of the parts to be treated. You should also understand that the angle at which the parts are hung is extremely important to maximize proper drainage.

Q36 You said that Plaforization™ and Toran™ are water-free materials, and you spoke about fluid flash-off. Does this mean that the material is based on hazardous solvents?

No, Plaforization™ and Toran™ products do not contain HAPs. Furthermore, the chemical formulations are totally free of halogenated compounds, ozone-depleting chemicals and carcinogenic compounds, and they are chrome-free. Based on their very low vapor pressures, they emit extremely low levels of VOCs, which quickly biodegrade in the atmosphere to CO² and water.

Q37 That’s fine, but in any case I need to comply with legislative requirements governing the emission of VOCs. Is that correct?

Of course, and we invite you to check with your environmental manager. We will prepare for you a standard certification we normally submit to environmental authorities. We have also developed an emissions calculator.

Q38 What if I need to increase my production and as a result cannot remain within legislative VOC limits?

With the limited emissions associated with Plaforization™ and Toran™, you should not have a problem. But if you are that close to your limit, we could simply change the product formulation and use ECOPHOR SYSTEM™ or TORAN SYSTEM™. These special formulations have been designed to operate with a patented scrubber, thanks to which you can recover and recycle a significant amount of fluids before the process gases are exhausted to the atmosphere.

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Q39 Does a Plaforization™ or Toran™ plant require rigorous maintenance?

Maintenance is very easy. Plaforization™ and Toran™ are sludge-free processes, so cleaning of spray nozzles, pipes, feed tank and filters is simple.

Q40 What about construction materials?

All parts in contact with the liquid should be made of stainless steel or polypropylene, or even galvanized in the case of Toran™.

Q41 Is that because the products are corrosive?

No, they are not corrosive. But if you use mild steel, the phosphating solution works on those surfaces as well as on the parts to be treated, and the solution can lose its efficiency.

Q42 How many square feet will a gallon treat?

Depending upon the shape of the part you are treating, you can expect 1,200 - 1,650 square feet per gallon.

Q43 How can I test Plaforization™ or Toran™ for my application?

We should make a preliminary test at your factory or you can send some of your parts to us for pretreatment.

Q44 How does a Plaforization™ or Toran™ system compare to a conventional phosphating system in terms of cost?

You can quite easily compare the total capital and operating costs of a properly-designed Plaforization™ or Toran™ unit to the many costs associated with the more complicated multi-stage conventional phosphating plant. The simple one-step Plaforization™ or Toran™ system will be less expensive and therefore more profitable in most situations. We have developed an ROI calculator for this purpose.

Q45 How many Plaforization™ systems are in operation today?

There are approximately 500 industrial Plaforization™ systems in operation worldwide. The process was introduced in Europe first, and then marketed overseas. Plaforization™ technology is available today in most European countries, in North America, South America, India, Japan, Malaysia, the Middle East and Australia.

Q46 In what fields is Plaforization™ commonly used?

Plaforization™ is mainly used in the following industrial sectors: shelving and metal furnishing, agricultural machinery, military applications, heating and air conditioning equipment, machine tools, the electromechanical industry, automotive industry, metal wire working and other OEM.

Toran™ is appropriate for all these applications, and particularly where increased performance is required. Several plants are now in operation or under construction.

Q47 What's the profile of your ideal client?

Plaforization™ and Toran™ customers come to us for a variety of reasons, among which are quality, consistency of performance, flexibility and simplicity of operations, decreased capital and operating costs, and excellent environmental profile of the products.



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