



SOLIDCITRIC- FREQUENTLY ASKED QUESTIONS

1) How much time can I save by using SolidCitric?

It depends - poor answer, we know. The severity of the lime scaling affects the time one will save, but in reality, the most important factor is whether you have other things you would rather be doing with the ROV instead of acid cleaning.

The best answer we can give you is that you must look at your past operations and determine how much time you typically spend on acid cleaning. Assuming that you have other things to do with your operational time then *please consider nearly all the time you have spent on acid cleaning today as time you would have saved by using our product.*

We have heard that our clients have saved 12 hours in some instances, other times 6 hours. It really varies on a case-to-case basis, as stated earlier above. However, imagine 12 hours saved with a stuck valve on for instance a rig at a million dollar day rate; your stockholders should love that!



2) How long should I allow the acid to work?

We like to say, "Let it work as long as possible". At a very minimum, it should be allowed to work for 2-4 hours.

Very important point follows: It would be very sad the moment a vessel, rig or ROV has a hold-up in operations because they are waiting for our product to work. This defies the entire winning purpose with our product. We believe that with good operational planning the acid can work for a long time if it is put to work as early as possible after arriving in field.

An Example:

A Client installed our product at Field A before continuing to Field B. When they later returned to do work at Field A everything they needed cleaned was finished.

Another example:

Install our product as the first point on the list during an as-found survey. Later on, once this is complete, then for instance valves that are to be operated during a commissioning sequence will have been cleaned and will less likely require high breakout torque values.



3) How fast does the SolidCitric acid dissolve?

This mainly depends on three factors.

1) *The enclosed volume of water that can be saturated with acid.* If this volume is small and there is little loss to the environment, then the acid will stop dissolving once the enclosed volume has reached full saturation.

2) *The ambient water temperature.* Like sugar, it dissolves faster in warm water than in cold water.

3) *The water depth.* Greater depth means greater hydrostatic pressure. A Polycarbonate tube that is open in one end encloses our acid. Due to this, it dissolves at an initially steady rate. However, external water pressure will create “channels” into the solid crystalline grains and hence increase the area exposed to water. Greater water depth will accelerate the dissolving rate.

An operational example: In the North Sea, at typically 200m water depth, *our 6 kg acid cartridge will dissolve in approximately 2-3 hours if allowed to dissolve into an unlimited volume.* Our 12 kg acid cartridge will dissolve in approximately 4-6 hours under the same conditions.

Important note:

Tests in our workshop revealed that the pH value in the entrapped water around the asset interface drops rapidly just a few minutes after the acid starts dissolving. In other words, *the water does not need to be fully saturated before the treatment becomes effective.*



4) What about HSE? Is it safe and environmentally friendly?

Yes. SolidCitric is manufactured from 100% citric acid that is even approved for human consumption, although not recommended in larger quantities. It has been used for subsea acid cleaning for several decades. It is listed as a “green” PLONOR chemical with the relevant authorities. We have a SolidCitric MSDS available for your perusal.

5) What is the depth rating for SolidCitric?

To date, we do not know if there are any limitations. We know that our clients often use it at an approximately 600 meters water depth without any problems. The important thing is that one does not remove the protection cap before the installation of the cartridge is imminent. Waving the cartridge around in the ROV manipulator without the protection cap will lead to a “wash out” of some of the SolidCitric acid; this is an unnecessary loss that should be avoided.