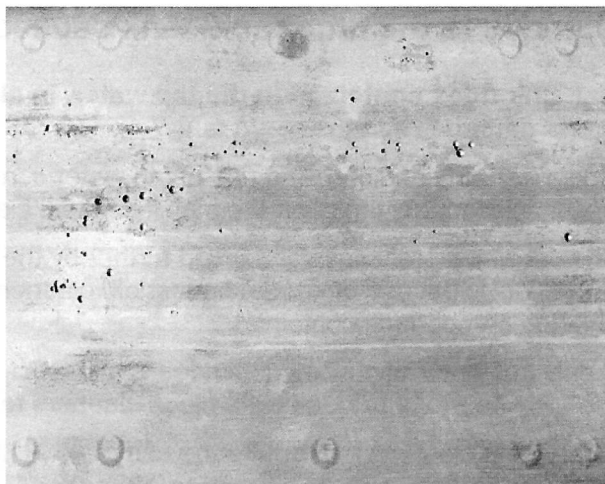


Typical example of pitting corrosion with corrosion circles



Pitting corrosion around the heating element

The manufacturer cannot be held liable for any of the above damages under the warranty for material defects.

How can pitting corrosion be prevented?

Do not use any acid aqueous cleaning media (pH value < 7) directly in an ultrasonic tank, into which fluoride (F⁻), chloride (Cl⁻) or bromide (Br⁻) ions enter by way of removal of contaminations from parts or through the cleaning agent. Also do not use any acids (except citric acid and phosphoric acid).

For further information please see the Operating Instructions, section 8.2.

Avoid contact between aggressive media and stainless steel. Use a separate container for aggressive media. Place the container into the tank filled with water and some surface-active agent.

The Elma product range includes special acid-resistant tanks and glass beakers:



Acid-resistant tank made of plastic, with cover
(available in 4 sizes)



Unit with glass beakers

Damage to the ultrasonic tank caused by chlorides

Can chlorides contained in the tap water, in cleaning media or in deposits on the cleaning items damage the ultrasonic tank?

Under certain conditions the use of tap water containing chlorides can cause corrosive damage to the stainless-steel tank and the stainless-steel cleaning basket.

The corrosive process is enhanced further by the use of cleaning media with pH values in the acid range, or by the use of certain household cleaners whose labels do not state minimum quantities of chloride compounds contained.

If only tap water containing chlorides is available, we recommend to use only cleaning chemicals in the alkaline range (e.g. all elma clean cleaners for serial units except ec 40; ec 60; ec 65).

Should the cleaning job require the use of an acid cleaner use distilled water instead of tap water

What causes pitting corrosion in an ultrasonic tank?

Certain acids that may be contained in the cleaning liquid corrode the stainless-steel surface and destroy the ultrasonic tank by pitting corrosion.

The process of destruction is accelerated with hot temperatures in the cleaning bath or on the surface of the cleaning tank (e.g. around the heating elements). In addition, the ultrasonic cavitation increases the pitting corrosion process.

Acids may be added to the cleaning liquid as such, or form in a chemical reaction in the cleaning liquid. Examples:

- Acids added to the cleaning liquid, or cleaning chemicals that contain acids (e.g. etchant), except citric acid, phosphoric acid and acids contained in Elma cleaning chemicals.
- Acids that form when halogenides enter an acid cleaning liquid (pH value < 7; this also applies to distilled water):
Examples:
Hydrofluoric acid forms when fluorides enter the cleaning liquid (e.g. from removed soldering residues containing hydrofluoric acid).
Hydrochloric acid forms when chlorides enter the cleaning liquid (e.g. from chlorinated tap water, household cleaners).
Hydrogen bromide forms when bromides enter the cleaning liquid.
- Entrainment of acid(s) or halogenide-containing liquid into the ultrasonic tank.
Example: The ultrasonic tank is filled with water. A separate container, e.g. a glass beaker, containing the aggressive cleaning agent is placed into the ultrasonic tank (which is the correct way of using aggressive media in an ultrasonic tank). When the beaker is taken out of the tank, a small quantity of the aggressive medium drips into the ultrasonic tank. With certain acids, the damaging effect becomes stronger with decreasing (!) concentrations of acid in the cleaning liquid.

Examples of pitting corrosion: