
Elma

Cleaning precision parts

Tools, precision molds, ball bearings, PCB-boards,

Cleaning process

Pre Cleaning

Process Step	Cleaning	RO-Rinsing	Drying
Xtra version	Pro	Pro	Pro or Pre
Ultrasonic	25/45 kHz depending on material	25/45 kHz depending on material	
Dosing	✓		
Filtration	✓		
Oil separator	Contamination related		
Conti flow		✓	

No difference to other industries

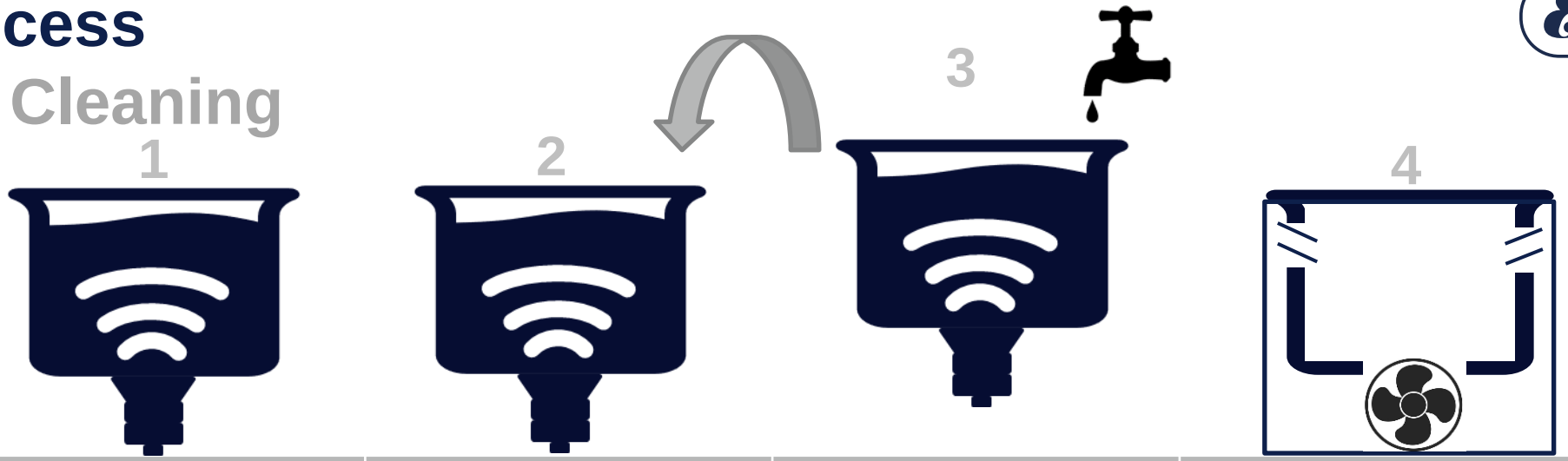
Cleaning process

Intermediate Cleaning

Process Step	Cleaning	Pre Rinsing	Final Rinsing	Drying
Xtra version	Pro	Pro	Pro	Pro or Pre
Ultrasonic	25/45 kHz depending on material	25/45 kHz	45 kHz or 37/130kHz	
Dosing	✓		✓	
Filtration	✓			
Conti flow		✓	✓	
Water quality		Tap or softened water	RO or DI-water	
Lift-Out			Based on geometry	
Oil separator	Contamination related			

Cleaning process

Intermediate Cleaning



Process Step	Cleaning	DI-Rinsing 1	D-Rinsing 2	Drying
Xtra version	Pro	Pro	Pro	Pro or Pre
Ultrasonic	25/45 kHz depending on material	45 or 37/130 kHz	45 or 37/130 kHz	
Dosing	✓		✓	
Filtration	✓			No difference to other industries
Conti flow			✓	
cascade		✓		
Lift-Out			Based on geometry	
Oil separator	Contamination related			

Short facts about precision parts

Precision parts can be made of a wide range of materials (differnt steel, stainless steel, aluminium, copper, brass, ceramic, composite material, electronic components etc.)
Based on the material, cleaning processes can also be completly different.

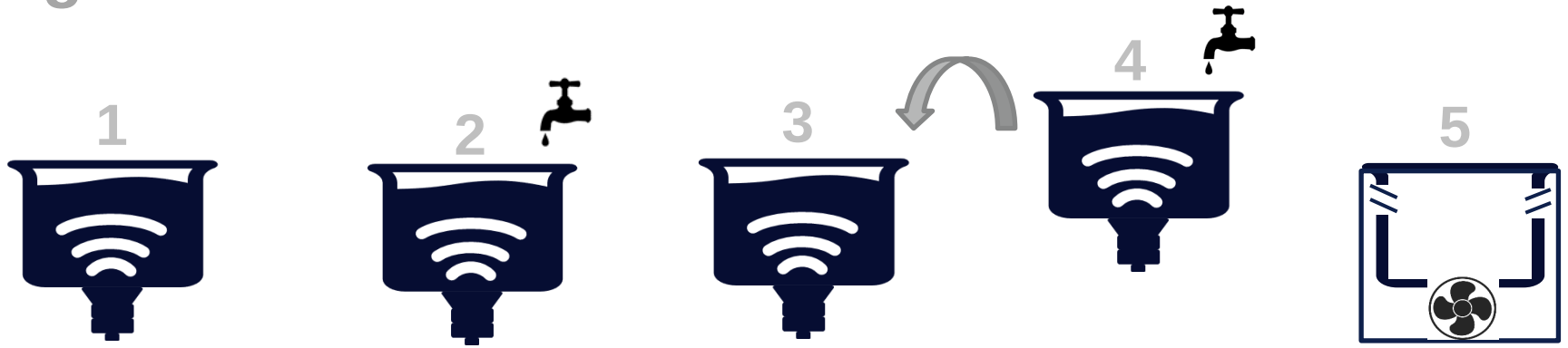
Corroding steel needs an anti corroding additive in the cleaning and/or rinisng tanks, most often in combination with RO-water.

The parts are sometimes complex and might need rotation. Depending on zhe desired quality it can be rotating baskets or integrated lift-rotation.

Electronic parts and components are most often cleaned with ZESTRON cleaning chemicals (Dr. O.K.Wack Chemicals). ELMA chemicals can also be used, but the longterm cooperation with Zestron is recommended.

Cleaning process

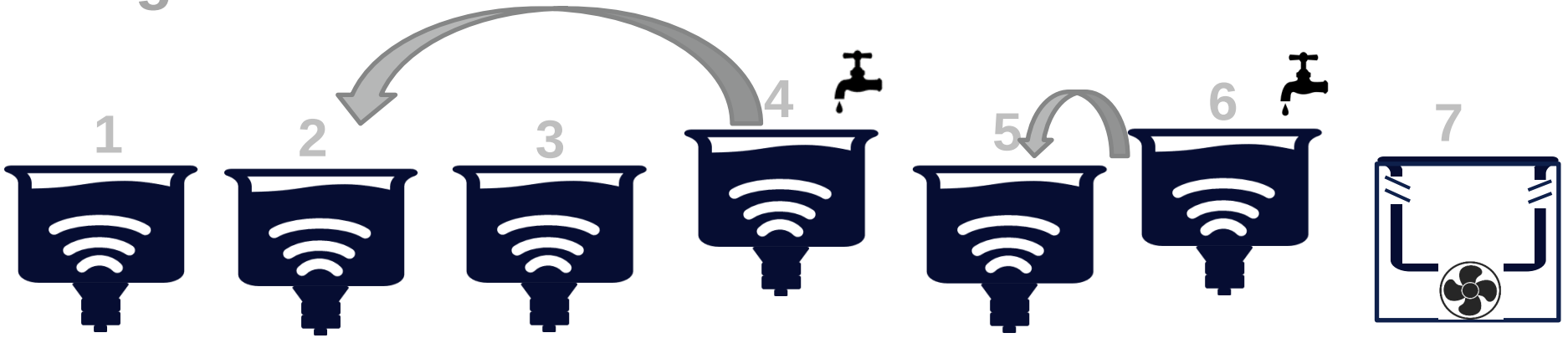
Final Cleaning Basic



Process Step	Cleaning	Pre Rinsing	DI-Rinsing 1	DI-Rinsing 2	Drying
Xtra version	Pro or Pre	Pro or Pre	Pre	Pre	Pre
Ultrasonic	25/45 kHz	45 or 37/130kHz	45 or 37/130kHz		
Dosing	✓				
Filtration	✓				
Conti flow		✓		✓	
cascade				✓	
Lift-Out				Based on geometry	

Cleaning process

Final Cleaning Ceramic Parts



Process Step	Cleaning alkaline	Pre Rinse 1	Cleaning acidic	Pre rinse 2	DI-rinse 1	DI-rinse 2	Drying
Xtra version	Pre	Pre	Pre	Pre	Pre	Pre	Pre
Ultrasonic	25/45 kHz	25/45 kHz	25/45 kHz	37/130 kHz	37/130 kHz	37/130 kHz	
Dosing	✓		✓			Alkaline: to remove contamination + organic residues (oil + fingerprints) Acidic: to remove mineral contamination	
Filtration	✓		✓				
Conti flow				✓		✓	
cascade				✓		✓	
Lift-Out						✓	

Cleaning processes
General Rules

Ultrasonic Frequencies:

Ultrasonic Frequencies are selected to clean but not destroy the surface or structures of parts to be cleaned

US-Frequency	Material
25 kHz	Silicate glass, Stainless Steel, Ceramic, corroding steel
37...**40**...45 **kHz**	**Aluminium**, Copper, Zinc, Standard Glass Subtrates, delicate parts, Electronics
80..**130 kHz**	**polished mirrors**, sensitive parts, delicate structures, coated surfaces

Cleaning processes
General Rules

Cleaning tanks:

If you have to clean **one part with one specific material and contamination**	**One** cleaning tank
If you have **heavy contamination**	One pre-cleaning tank followed by a final cleaning tank (**2 tanks**)
If you have **different materials**	Maybe **different cleaning tanks** needed

Cleaning processes
General Rules

Rinsing tanks:

Number of Rinsing Tanks	Final Quality
One rinsing tank	**Basic Cleaning, Pre cleaning**
Two Rinsing tanks Pre rinse followed by final rinse tank	**Intermediate Cleaning**
Three Rinsing tanks: Pre rinse followed by 2 DI-rinsing in cascade	**Final Cleaning**
Four Rinsing tanks: 1 x Pre rinse followed by 3 DI-rinse tanks	**Final Cleaning with high throughput or drag out**

Cleaning processes
General Rules

Last Rinsing tank:

Extras	advantage
Lift Out	• Perfect for pre drying of simple surfaces • Reducing of drag-out less water→less possible stains • Ultrasonic in combination with lift out not needed
Conductivity Sensor	to check the DI-water quality
TOC sensor	to monitor Total Organic Carbon (Photonics and Medical)
Online particle meter	to monitor micro particles in liquid (Photonics)

Precision Cleaning Key Words

Key word	meaning	details
material	If aluminium or steel we need the exact alloy or material specification	Big impact on process possible if materials are not specified.
substrate	Different material	Specification needed
Coating ready cleaning	Final cleaning. After coating the products are finished and packed	TOC-values are specified. Organic material can be oil, grease but also bacteria and non-metalic/non-mineral dirt

Precision Cleaning Key Words

Key word	meaning	details
Carbide steel (Hartmetall)	Extremely hard steel for tool manufacturing differnt brand names as Tungsten, wolframic carbide =WC	Usually hardening or coating process after cleaning
PCB	Printed circuit board	We have to remove soldering residues and/or flux
Organic residues	Oil, grease, fingerprints	Bad for coatings and to use in vacuum applications. Has to be removed
Mineral residues	Salts and minerals, often from bad pre cleaning (cannot be removed with alcohol)	Bad for coatings. Once dry the stains cannot be removed anymore.

Precision Cleaning Key Words

Key word	meaning	details
DI-water	De-Ionized water in best quality	To reach best values we need for implants beside UV-lamps also UV-reactors to kill all bacteria and a ultra-filtration to remove the small „dead bodies“ for a low TOC value.
cobalt leaching	Carbide material (for cutting tools) can be harmed by some cleaning chemicals and DI-water.	Carbide steel contains cobalt. Cobalt leaching causes shock senistive tools and coating pronlems.Can be avoided by adding ELMA Con-serve into rinsing water

Precision Cleaning Key Words

Key word	meaning	details
Data logger	Transfer of process information to customers network	Sotware application to transfer data with html-file
Lead frame		
Wire bonding		

Vielen Dank
für Ihre Aufmerksamkeit.