SYSTEM CLEANING FOR ELECTRONICS MANUFACTURERS

Technology development

Engineering

Process Design & Service

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kolb Cleaning Technology is one of the world’s leading companies in manufacturing cleaning systems for the electronics producing industry.

For more than 30 years, kolb is developing innovative technologies for the cleaning in the electronics industry, both in mechanical engineering and cleaning chemicals. Global companies such as Alcatel, Bosch, Dyson, EADS, General Electric, Flextronics, Nokia, Philips, Siemens and many more have certified kolb cleaning systems and detergents for their businesses and share it worldwide in their production.

The kolb product portfolio is based on patented core technologies like PowerSpray® and AirFlow® in mechanical engineering, the TernarySequence® technology in the cleaner business or the VMH® and CWA® drying processes in mechanical engineering, the TernarySequence® technology in cleaning chemicals, as well as on new process technologies like HME® (Heavy Metal Educting) in waste water treatment.

In the kolb technical center and analysis lab new developments are permanently tested and existing technologies, chemicals and processes are continually developed further.
## Cleaning in electronics production

### What contamination must be cleaned in which area?

<table>
<thead>
<tr>
<th>Areas</th>
<th>Goods to be cleaned</th>
<th>Contaminations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SMD-adhesive</td>
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<tr>
<td><strong>Electronic products cleaning</strong></td>
<td>Assembled PCBs</td>
<td>✔️</td>
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<td></td>
<td>DCBs</td>
<td>✔️</td>
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<td>Hybrids / HDIs / SiPs</td>
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<td>Misprints (single side mounted)</td>
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<td><strong>Electronic tools cleaning</strong></td>
<td>Screens / Stencils</td>
<td>✔️</td>
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<td>Misprints (bare boards)</td>
<td>✔️</td>
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<td>Carriers / Pallets</td>
<td>✔️</td>
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<td>Condensation traps (Filters, radiators from convection reflow ovens)</td>
<td>✔️</td>
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<td>ESD Boxes / Containers</td>
<td>✔️</td>
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<td>Magazines / Trays</td>
<td>✔️</td>
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<td>Machinery parts (Flux units - sheet metal - pumps etc.)</td>
<td>✔️</td>
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<td>Process chambers (Soldering systems)</td>
<td>✔️</td>
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<td></td>
<td>Other production tools</td>
<td>✔️</td>
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</table>

### The up to date cleaning requirements:
- Reproducible quality in electronics product cleaning
- Fastest possible reutilization of tools in electronics tools cleaning
- Flexible, versatile, industry 4.0 ready smart systems with a preferably multiple process application spectrum
- Water and energy saving operation
- No extra safety areas required
- Ecologically safe processes with ecologically safe chemistry
- Detergents that clean fast and thoroughly without residues
- Uncomplicated disposal or processing of cleaning detergents

[www.kolb-ct.com](http://www.kolb-ct.com)

NOTES
MultiEx® 3 detergents remove thoroughly copper oxide / CuO, aluminium oxide / Al₂O₃, SMD adhesive (optional), solder paste, colophonium flux, water-based flux, solder paste (soldered).

MultiEx® 3D cleaners have a special unique „WashCoat“ formula. It ensures that cleaned and deoxidized metal surfaces remain long oxide-free without any detectable layer on the surface of the component.

MultiEx® 3D series is characterized by a nuanced raw material shift between the individual detergent models, offering a broad spectrum of efficacy that creates the prerequisite to clean all commercially available fluxes and pastes thoroughly and with best material protection.

MultiEx® 3D detergents are delivered as ready-to-use mixture for direct use in kolb systems with PowerSpray® technology and all common spray-in-air cleaning systems. Depending on the product and cleaning task also suitable for kolb AirFlow® systems as well as for all common spray-in-immersion and ultrasonic cleaning systems.

MultiEx® 3D detergents work in three dimensions:
1. Flux removal
2. Deoxidation of the metal surfaces, especially with copper and aluminum,
3. Passivation of metal surfaces to avoid renewed rapid oxidation.

The new kolb MultiEx® 3D cleaner series offers aqueous alkali deep cleaners that are ideally suited for the thorough and gentle cleaning of DCBs / power electronics, assemblies, ceramic substrates, aluminium, non-ferrous metals and, depending on the cleaning task, also for the qualified cleaning of screens and stencils.

MultiEx® 3D series:
- MultiEx® 3D A8 - standard broadband DCB / power electronics cleaner
- MultiEx® 3D H2 - standard broadband cleaner for DCBs and PCBs
- MultiEx® 3D B1 - special DCB cleaner for specific processes for DCBs and power Units

Relevant kolb cleaning systems:
- AQUUBE® X series for PCBs and DCBs
- AQUUBE® L series for PCBs and (optional) DCBs
- PSE L series for PCBs
- AQUUBE® HY series for products and tools
- AQUUBE® M series for screens, stencils and tools
- PSE® M series for screens, stencils and tools
- PSE 300 2HY for screens, stencils and PCBs
- AF series for carriers, machine parts, condensate filters

Further information: www.kolb-ct.com
The cleaning tasks in electronics production are manifold. The requirements go from the highly demanding PCB and hybrid cleaning, the cleaning of sensitive production tools such as screens and stencils to the maintenance cleaning of auxiliary tools such as solder carriers or ESD boxes.

Die kolb MultiEx® VR series offers aqueous alkaline detergents with an extremely broad spectrum of efficacy. MultiEx® VR detergents are very durable and most suitable for the quick and thorough cleaning with best material protection of assembled PCBs, ceramic substrates, misprints, stencils, solder carriers, solder pallets, ESD boxes, PCB magazines.

Depending on cleaning task MultiEx® VR detergents are also suitable for condensation traps, coolers and steel sheets.

All cleaners of the series provide a high surface cleanliness and, due to their high fluidity, are perfectly suitable for the thorough cleaning of low standoffs.

MultiEx® VR series detergents clean particularly synthetic and natural resins, colophonium and flux as well as solder paste and also oils, grease and dust.

MultiEx® VR is characterized by a nuanced raw material shift between the individual detergent models, offering a broad spectrum of efficacy that cleans all commercially available fluxes and pastes thoroughly and with best material protection.

Due to the TS+ pH buffering (see also page 22), MultiEx® VR cleaners have a significantly longer effectiveness / working life (long bathing periods), so they have to be changed less and thus save considerable operating costs.

MultiEx® VR series detergents are delivered as ready-to-use mixture (except MultiEx® VR-SP concentrate) for direct use in kolb systems with PowerSpray® technology and all common spray-in-air cleaning systems.

Depending on the product and cleaning task also suitable for kolb AirFlow® systems as well as all common spray-in-immersion and ultra-sonic cleaning systems.

MultiEx® VR series:
- MultiEx® VR-SP RM - broadband standard PCB cleaner (single phase) (as ReadyMix or concentrate)
- MultiEx® VR-HPA - broadband cleaner for PCBs with sensitive components (e.g. aluminium)
- MultiEx® VR-18 - special cleaner for hard to clean fluxes and PCBs (e.g. after several soldering processes)

Relevant kolb cleaning systems:
- AQUUBE® X series for PCBs and DCBs
- AQUUBE® L series for PCBs and (optional) DCBs
- PSE L series for PCBs
- AQUUBE® HY series for products and tools
- AQUUBE® M series for screens, stencils and tools
- PSE® M series for screens, stencils and tools
- PSE 300 2HY / 2VL for screens, stencils and PCBs
- AF series for carriers, machine parts, condensate filters

Further information: www.kolb-ct.com
MultiEx® A12

MultiEx® A12 is an aqueous alkaline broad-band cleaning detergent particularly for colophony and flux.

MultiEx® A12 is most suitable for the quick and thorough cleaning of assembled PCBs, screens, solder frames, solder pallets, ESD boxes, PCB magazines. Depending on cleaning task also suitable for stencils, screens, condensation traps, steel sheets.

MultiEx® A12 is a ReadyMix for direct use in kolb systems with PowerSpray® or AirFlow® technology and any common spray-in-immersion or spray-in-air cleaning system. Depending on product and cleaning task also suitable for ultrasonic cleaning systems.

Relevant kolb cleaning systems:
- AQUBE® M series for screens, stencils and tools
- PSE® M series for screens, stencils and tools
- PSE 300 series for stencils, screens and PCBs
- AQUBE® HY series for products and tools
- AQUBE® L series for PCBs
- PSE L series for PCBs
- AF series for carriers, ESD boxes

MultiEx® B11

MultiEx® B11 is an aqueous alkaline detergent with an extremely broad spectrum of efficacy. The robust economy cleaner is mainly suitable for tool cleaning.

MultiEx® B11 cleans particularly SMD-paste and (conditionally) also SMD adhesive and flux.

MultiEx® B11 is most suitable for the quick and thorough cleaning with best material protection of stencils, screens, solder frames, solder pallets, ESD boxes, PCB magazines. Depending on cleaning task also suitable for assembled PCBs or condensation traps, coolers, steel sheets.

Relevant kolb cleaning systems:
- AQUBE® M series for screens, stencils and tools
- PSE® M series for screens, stencils and tools
- PSE 300 series for stencils, screens and PCBs
- AQUBE® HY series for products and tools
- AQUBE® L series for PCBs
- PSE L series for PCBs
- AF series for carriers, machine parts, filters

Further information: www.kolb-ct.com

NOTES
**MultiEx® N7-TS**

MultiEx® N7-TS (as ReadyMix or concentrate) is a broadband neutral cleaning agent and provides excellent results for cleaning screens and stencils as well as for misprints and stencil underside cleaning in screen printers. The rinse suitable concentrate can be used in water-free systems / processes.

MultiEx® N7-TS cleans particularly SMD-paste, dust, fats, oils, colophonium and (conditionally) SMD adhesive and flux.

The cleaner is formulated as a single-phase agent. No phase separation occurs during the cleaning process. The cleaner remains stable in itself and does not have to be agitated permanently.

**Relevant kolb cleaning systems:**
- AQUBE® M series for screens, stencils and tools
- PSE® M series for screens, stencils and tools
- PSE 300 series for stencils, screens and PCBs
- AQUBE® HY series for products and tools
- AQUBE® L series for PCBs
- PSE L series for PCBs

**MultiEx® N8**

MultiEx® N8 is an aqueous, pH-neutral regenerative cleaning concentrate.

MultiEx® N8 cleans particularly SMD-paste and adhesive as well as colophony and flux and is most suitable for the quick and thorough cleaning of stencils and screens with best material protection.

Depending on cleaning task also suitable for assembled PCBs, solder carriers, solder pallets, ESD boxes, PCB magazines.

MultiEx® N8 is a cleaning concentrate to blend with water for use in kolb systems with PowerSpray® technology and common spray-in-air cleaning systems.

**Relevant kolb cleaning systems:**
- AQUBE® M series for screens, stencils and tools
- PSE® M series for screens, stencils and tools
- PSE 300 series for stencils, screens and PCBs
- AQUBE® HY series for products and tools
- AQUBE® L series for PCBs
- PSE L series for PCBs

Further information: [www.kolb-ct.com](http://www.kolb-ct.com)

**NOTES**
MultiEx® SC is a pH neutral screen cleaner developed especially for the cleaning of resistant conductive pastes from phototechnical screens and stencils, PumpPrints, misprints, aluminium. Conditionally also suitable for assembled PCBs, carriers, ESD boxes, magazines.

The cleaner is formulated as a single-phase agent. No phase separation occurs during the cleaning process. It remains stable in itself and does not have to be agitated permanently.

MultiEx® SC can also be used as a detergent in a completely water-free process, especially in the case of water-sensitive products. (Water-free rinsing can be carried out with MultiEx® GC)

Relevant kolb cleaning systems:
- AQUBE® M series for screens, stencils and tools
- PSE® M series for screens, stencils and tools
- PSE 300 series for stencils, screens and PCBs
- AQUBE® HY series for products and tools
- AQUBE® L series for PCBs
- PSE L series for PCBs

Further information: www.kolb-ct.com
MultiEx® Rapid

MultiEx® Rapid is an aqueous alkaline high-performance PCB cleaning concentrate for electronics manufacturing and specifically removes rosin and flux. MultiEx® Rapid is ideally suited for the thorough and fast cleaning of assemblies with difficult to clean flux residues (for example after several soldering processes).

MultiEx® Rapid is a concentrate to be mixed with water to be operated in kolb PowerSpray® systems as well as all common spray-in-air, spray-in-immersion, air-in-immersion (e.g. kolb AirFlow® systems) and ultrasonic cleaning systems.

Perfectly suited for high temperature cleaning (e.g. kolb HT systems)

Relevant kolb cleaning systems:

• AQUBE® L series for PCBs
• PSE L series for PCBs
• AQUBE® HY series for products and tools
• AQUBE® M series for screens, stencils and tools
• PSE® M series for screens, stencils and tools
• PSE 300 2HY for stencils and PCBs
• AF series for carriers, machine parts, filters

CF1® is an aqueous alkaline cleaning ReadyMix for manual cleaning e.g. by spraying and, after a short soaking period, wiping with a cloth.

CF1® cleans colophonium (rosin) and flux quickly, thoroughly and with best possible product protection e.g. from machinery parts, solder frames, carriers, aluminium, PVC, stainless steel, glass etc. without rinsing.

In case of hardened and old contamination we recommend the product kolb G50®

G50® is an aqueous alkaline cleaning ReadyMix for manual intensive cleaning of hardened and old residues e.g. by spraying and, after a short soaking period, wiping with a cloth and wipe rinsing with kolb CF1® or with water.

G50® cleans without rinsing colophonium and flux quickly, thoroughly and with best possible product protection e.g. from machinery parts, solder frames, carriers, GRP, PVC, stainless steel, glass etc.

Both cleaners are not sensitive to heat, have high fluidity, dry quickly and without streaks, and can therefore be used even with hand-warm oven temperatures.

NOTES
Condensate filters, solder carriers, boxes

ContraFlux® Basic

ContraFlux® Basic is an established versatile aqueous alkaline broadband cleaner concentrate specifically designed for maintenance cleaning of tools and containers used in electronics manufacturing.

ContraFlux® Basic particularly cleans rosin, colophonium and flux residues is ideally suited for the quick and thorough cleaning with best material protection of solder frames, solder masks, ESD boxes, PCB magazines, condensate traps and radiator panels.

ContraFlux® Basic is a concentrate to be blended with water (ratio 1:3 to 1:6) and to be used in kolb AirFlow® systems as well as in all common spray-in-immersion cleaning systems.

Depending on product and cleaning task also suitable for ultrasonic cleaning systems and manual cleaning. (Product name until 10/2017: ContraFlux®)

Relevant kolb cleaning systems:
• AF series for filters, carriers and machine parts, pallets, ESD boxes, condensate traps

Solder carriers

ESD boxes

ContraFlux® Basic

ContraFlux® FM

ContraFlux® FM is an aqueous alkaline special cleaner for maintenance cleaning especially of condensate management systems specifically from condensate and rosin.

ContraFlux® FM is ideally suited for the quick and thorough cleaning with best material protection of condensate traps, filter sheets, coolers, cyclones.

Depending on the cleaning task also suitable for solder frames, solder pallets, ESD boxes and PCB storage magazines.

ContraFlux® FM can absorb flux up to 20 percent of its volume. This means a very long service life and thus high cost efficiency. Ideally suited for the external cleaning of piping and cyclones. Depending on product and cleaning task also suitable for ultrasonic cleaning systems and manual cleaning.

Relevant kolb cleaning systems:
• AF series for filters, carriers and machine parts, pallets, ESD boxes, condensate traps

Condensation traps

Seho Filter

Further information: www.kolb-ct.com

Notes
Cleaning enhancing and corrosion protection

PowerBooster® series

The kolb PowerBooster® additives series offers high quality cleaner boosting and refreshing / bath life time extending with integrated corrosion protection.

The cleaner additives are suitable for almost all alkaline cleaning media and can be applied in immersion, spray and ultrasonic systems and will be added according to the relevant mixing table to the ready mixed cleaning fluid. (Not suitable for direct mixing with concentrates)

Depending on the robustness or sensitivity of the product and the special process requirements, kolb PowerBooster® products deliver more power boosting or corrosion protection.

PowerBooster® TPA is an additive for kolb detergents with highest cleaning power boost. The additive can be used both to quickly and thoroughly clean heavily contaminated, robust parts and / or to be added as a refresher to degrading cleaners. The product contains approx. 20% corrosion protection.

PowerBooster® HPA is an additive for kolb detergents with a strong cleaning power boost. The additive can be used both to quickly and thoroughly clean contaminated, less sensitive parts and / or to be added as a refresher to degrading cleaners. The product contains approx. 40% corrosion protection.

PowerBooster® MPA is an additive for kolb detergents with an evenly balanced boost of cleaning power and / or refreshing to degrading cleaners and corrosion protection. The product contains approx. 50% cleaning enhancer and 50% corrosion protection.

PowerBooster® LPA is an additive for kolb detergents with strong corrosive protection and a light cleaning power boost. The additive can be used both to quickly and thoroughly clean highly sensitive parts and / or to be added as a refresher to degrading cleaners. The product contains approx. 80% corrosion protection and 20% cleaning booster.

Further information: www.kolb-ct.com

kolb detergents: aqueous - efficient - safe

NOTES
<table>
<thead>
<tr>
<th>For even more performance</th>
<th>For more cleaning tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Additives</strong></td>
<td><strong>Special cleaners</strong></td>
</tr>
<tr>
<td><strong>AntiFoam® F12</strong></td>
<td><strong>ESD UniClean</strong></td>
</tr>
<tr>
<td>is an aqueous, pH-neutral</td>
<td>is a neutral cleaner</td>
</tr>
<tr>
<td>silicone-free foam</td>
<td>especially for ESD-</td>
</tr>
<tr>
<td>regulator for <strong>kolb</strong></td>
<td>equipment for all kinds</td>
</tr>
<tr>
<td>cleaning detergents. The</td>
<td>of working tables,</td>
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<tr>
<td>surface active single-</td>
<td>shelves and other</td>
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<tr>
<td>compound antifoaming</td>
<td>equipment. ESD UniClean</td>
</tr>
<tr>
<td>agent is added, depending</td>
<td>has antistatic properties</td>
</tr>
<tr>
<td>on water hardness, in a</td>
<td>and is dust repellant.</td>
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<tr>
<td>ratio of approx. 0.007 to</td>
<td>The electrostatic charge</td>
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<tr>
<td>3 % to the detergent /</td>
<td>will be suppressed e.g.</td>
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<tr>
<td>water mix and can be</td>
<td>on computer screens.</td>
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<tr>
<td>rinsed residue free.</td>
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<tr>
<td><strong>AntiFoam® EL50</strong></td>
<td><strong>ESD FloorClean</strong></td>
</tr>
<tr>
<td>is an aqueous and</td>
<td>is a combined cleaner</td>
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<tr>
<td>silicone-free neutral</td>
<td>and polisher for ESD-</td>
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<tr>
<td>deaerator and defoamer</td>
<td>floors to be used for</td>
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<tr>
<td>which is added directly</td>
<td>the daily care, applied</td>
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<tr>
<td>to the cleaning bath</td>
<td>in a wet-wiping process.</td>
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<td>with foam occurring due</td>
<td>A permanent polishing</td>
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<tr>
<td>to the entry of dirt.</td>
<td>process will enhance</td>
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<tr>
<td>The mixing ratio e.g. at</td>
<td>the durability and</td>
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<tr>
<td>75 l bath volume is 50</td>
<td>appearance of the polish</td>
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<tr>
<td>- 200 ml EL50 equal to</td>
<td>Also the conductivity of</td>
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<tr>
<td>0.07 to 0.3%.</td>
<td>the floor will be</td>
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<tr>
<td><strong>ContraCor® A2</strong></td>
<td><strong>DisplayClean</strong></td>
</tr>
<tr>
<td>is an inhibitor additive</td>
<td>is especially suitable</td>
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<tr>
<td>for <strong>kolb</strong> cleaning</td>
<td>for the displays of</td>
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<tr>
<td>detergents for the</td>
<td><strong>kolb</strong> cleaning</td>
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<tr>
<td>protection of sensitive</td>
<td>systems, common</td>
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<tr>
<td>aluminum surfaces. It</td>
<td>computer displays as</td>
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<tr>
<td>prevents from tarnishing</td>
<td>well as for the cleaning</td>
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<td>during the cleaning</td>
<td>of almost all plastic</td>
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<td>process and is added to</td>
<td>surfaces. DisplayClean</td>
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<td>the cleaning bath in a</td>
<td>acts antistatic to</td>
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<td>concentration ratio of</td>
<td>prevent from electrostatic</td>
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<tr>
<td>0.25 to 5%.</td>
<td>charges and dust</td>
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<td><strong>DIS 10/4</strong></td>
<td>attraction on displays</td>
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<tr>
<td>is an aqueous, pH-neutral</td>
<td>and surfaces.</td>
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<td>cleaning bath additive</td>
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<td>(dispersing additive)</td>
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<td>and boosts detergents</td>
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<td>for flux and resin</td>
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<td>removal in electronics</td>
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<td>cleaning systems. The</td>
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<td>mixing ratios go from</td>
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<td>0.4 to 4 % depending on</td>
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<td>the detergent type and</td>
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<td>constitution.</td>
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<tr>
<td><strong>pHReducer</strong></td>
<td><strong>WipeEx SA120</strong></td>
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<tr>
<td>are aqueous neutralization</td>
<td>is an aqueous pH-neutral</td>
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<tr>
<td>agents, available as a</td>
<td>cleaning ReadyMix for</td>
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<tr>
<td>concentrate and fourfold</td>
<td>the machine cleaning</td>
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<tr>
<td>concentrate. It reduces</td>
<td>with fleece for</td>
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<tr>
<td>the pH-value of a wasted</td>
<td>underscreen cleaning in</td>
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<td>rinse water to a favoured</td>
<td>screen printers. It</td>
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<tr>
<td>value and thus allows for</td>
<td>cleans SMD-adhesive and</td>
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<tr>
<td>environmentally sound</td>
<td>SMD-paste and is ready</td>
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<tr>
<td>disposal.</td>
<td>for use in cleaning</td>
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<td></td>
<td>tanks of screen</td>
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<td></td>
<td>printers for stencil</td>
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<tr>
<td></td>
<td>underscreen cleaning.</td>
</tr>
<tr>
<td><strong>LubriCat® 10</strong></td>
<td><strong>WetWipes SA120</strong></td>
</tr>
<tr>
<td>is a lubricant additive</td>
<td>are ready to use tissues,</td>
</tr>
<tr>
<td>for all <strong>kolb</strong> detergents</td>
<td>soaked with the special</td>
</tr>
<tr>
<td>(after consultation with</td>
<td>aqueous and pH-neutral</td>
</tr>
<tr>
<td>the application</td>
<td>detergent WipeEx SA120</td>
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<tr>
<td>department) and for</td>
<td>for the manual cleaning</td>
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<tr>
<td>foreign cleaners</td>
<td>of SMD-tools such as</td>
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<tr>
<td>classified for use of</td>
<td>scrapers, squeegees,</td>
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<tr>
<td>LubriCat® 10. The best</td>
<td>etc.</td>
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<tr>
<td>efficiency is reached at</td>
<td></td>
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<tr>
<td>a blending ratio of 0.5</td>
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<td>to 0.8 liters per 100 l</td>
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<tr>
<td>cleaning mixture.</td>
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</tbody>
</table>

**kolb** detergents: aqueous - efficient - safe

Further information: www.kolb-ct.com
Machine care, detergent analysis

Service products

MaintClean® is a concentrate for the elimination of limescale, fungi and bacteria for use in almost all kinds of electronics cleaning systems. MaintClean® cleans also during the vapor phase and thus reaches areas that normally are difficult to access with liquids.

MaintFect® is a high performance bactericide for maintenance use and can be added to any type of cleaning and emulsion system. Especially suitable for disinfecting tank systems in kolb SYMBIO modules for water treatment, to be added in a concentration of 0,01 - 0,04 %

pHSticks are measuring stripes allow a quick, approximate (tolerance: +/− 0,5-1) control of the pH-value e.g. of a cleaning detergent or rinse water. For more detailed inspections, kolb has test kits with appropriate equipment on offer (see below).

SC300 is a complete test kit in a service case for fast bath monitoring / analysis of the current operating state of a TS powered cleaning medium. With the test kit, tank contents, with kolb TS cleaners (see page 26), can be easily and quickly monitored and checked regularly.

SC400 is a complete analysis kit in a service case for fast state determination / process monitoring of kolb MultiEx® cleaners. The following measuring options are available with the SC400:
1. Refraction / brix, 2. pH value 3. µS conductivity (maximum 1999 µS), 4. Total hardness

SC600 is a test set in a service case for the rapid detection of flux residues. With the kolb FluxControl fluid contained in the case, PCB assemblies or solder joints can be quickly and easily checked for critical interferences by flux.

kolb detergents: aqueous - efficient - safe

NOTES

A clean analysis means clean products

Analysis service

In our analytical laboratories (Germany, China, Australia, USA), we can quickly identify and document the necessary data for an optimal cleaning process. Our research, experience and the information we get through the constant communication with our customers, we bundle to a comprehensive service offer.

The following analyzes can be carried out in detail:
• Residual ion contamination measurements on boards
• Optical inspection, microscopy
• IR spectroscopy of liquids and solids
• Adhesion test, adhesion measurements (acc. to Dollytest)
• UV spectroscopy of liquids
• Flame point measurements (Abel-Pensky / Pensky-Martens)
• Viscosity measurements, digital with measurement curves
• Digital sliding measurements
• Gloss measurement of surfaces / 20 ° & 60 ° angle
• Bleeder resistance measurement according to EC 61340
• Photometric investigations of liquids
• Determination of evaporation residues
• Salt spray test and climatic chamber tests
• Wet chemistry analysis
• Solid / liquid separation systems
• AAS atomic absorption spectroscopy
• HPLC High Performance Liquid Chromatography
• Electron scanning microscopy

Further information: www.kolb-ct.com

13
Highly effective, highly efficient

TernarySequence® detergents

TernarySequence® (shortcut: TS) is a kolb developed detergent technology with a three sequence process. Detergents with TS-technology are homogenous filtration media, which first thoroughly clean products and regenerate entirely afterwards without needing an extra phase-separation. The regenerative TS-detergents have several advantages, e.g:

- Broad cleaning spectrum
- Regeneration through simple filtration
- Long lifetime and thus high economic efficiency
- Process stability for PCB cleaning by the use of salt-free raw materials

The functionality of TernarySequence® technology®

Sequence 1: Elimination of particle adhesion
Cleaning detergent molecules move under / dissolve the contamination and remove all contamination / particles from the product.

Sequence 2: De-activation of particles
Cleaning detergent molecules encapsulate (homogenous encapsulation) the contamination. The particles are completely embedded and can no longer settle in other places.

Sequence 3: Particles transfer to filtration
The encapsulated dirt particles can be retained even with very simple filter mechanisms. Thus, the cleaner is regenerated again and the molecules ready to dissolve and embed more dirt particles.

kolb cleaners with a TS+ labeling have a high-volume TS+ longlife pH buffer. This means that TS+ cleaners have about twice as much buffering as comparable products on the market due to their unique formulation.

Thus, TS+ cleaners can absorb significantly more contaminants before their pH value drops significantly which means the cleaner loses its effect and has to be changed. As a result, TS+ detergents have an significant longer working life, which means they have to be changed less frequently, thus saving considerable operating costs.

kolb detergents: aqueous - efficient - safe

Against the over-fertilization of waters

Taking care of the environment

Chemical cleaners for non-water-soluble contaminations usually contain phosphorus and nitrogen. Primarily their oxygen compounds (nitrates, phosphates) that enter the waste water from households, agriculture and industry lead to a threatening over-fertilization of the water bodies (eutrophication).

This leads to a mass multiplication of algae and cyanobacteria. After the algae die off, they are broken down by bacteria, requiring so much oxygen that their concentration in the water drops rapidly. The subsequent rotting processes consume the remaining oxygen residues, resulting in toxic hydrocarbons, e.g. methane. Fish, crabs and snails die from oxygen deficiency and the water is biologically dead and no living creatures can survive.

kolb was already known as the inventor of aqueous electronic cleaning in the 80s, when the entire electronics industry still cleaned with solvent-based chemicals, and is thus a pioneer for environmentally-friendly cleaning products and processes. 30 years of experience in the development of cleaners have made almost all kolb chemical products completely free of phosphates and nitrates.

A significant proportion of the kolb detergents are already completely free of phosphorus and nitrogen by innovative formulations: e.g. MultiEx® N7; MultiEx® GC and MultiEx® VR-20, AntiFoam® EL50, WipeEx SA120, InoX - just to name a few.

All kolb detergents are eco-audit compatible, with VOC reduced formulations and low odor. They can be used without explosion protection and offer broadband application, optimum efficiency as well as a disposal circuit.

Disposal

All detergents / chemicals supplied by kolb can also be disposed by kolb. The products for disposal have to be classified as per their waste classification.

Further information: www.kolb-ct.com
**Demonstration center**
In our Demonstration center we are able to simulate all processes of our machines at customer’s location. If necessary it is possible to upgrade modify and optimize the installed options to fulfill special requirements right away. This saves time and immediately leads to the necessary results. Here our customers find the possibility for extensive trials and analysis to determine all aspects of their cleaning requirements to find the best possible configuration including mechanics (cleaning system), medium (aqueous detergents) and process (electronics and software).

**Trainings**
**kolb** offers trainings and workshops for the optimization of our customers processes and for their service- and maintenance teams - upon request with tailored training concepts and certificates for the participants. Trainings can likewise be executed in our demonstration center or directly at our customers plant.

**Service request**
You require our support? For agreements / questions via telephone you can reach us under our Hotline +49 (0) 2154 / 94 79 - 44, Monday-Friday 8 am to 5 pm If you need a technician, please send us the completed **kolb** service requisition. You will find it in the manual of your cleaning system or please demand the form online under service-request.

**Hotline**
Information & Sales: Monday - Friday from 8 am to 5 pm, Phone +49 (0) 2154 / 9479 - 38. Service & Technical Support: Monday - Friday from 8 am to 5 pm, Phone: +49 (0) 2154 / 9479 - 44, Mobile: +49 (0) 1783 / 9479 - 44 (German) and - 22 / - 27 (English)

**Amortization and financing**
Besides an immediate submittance of quotations we will also provide the basics for return on investment calculations, leasing offers.

**kolb** Cleaning Technology GmbH is DIN ISO certified already since more than 15 years. Regular and comprehensive examinations and audits from external consultants help us to assure and guarantee our high manufacturing and quality standards.

**Amortization and financing**
Besides an immediate submittance of quotations we will also provide the basics for return on investment calculations, leasing offers.

**kolb** offers its customers service right from the beginning: precise determination of the requirement, mutual description of the demand, test of possible solutions, support with extra-disciplinary problems, etc.

Upon demand in a close cooperation with its customers all tasks will be addressed and solved quickly and efficiently. This does likewise include the time after the sale of a system, particularly when it is necessary to work on further requirements or upgrade the product or the process to new cleaning tasks.

Our company is logistically perfectly located in the industrial area Willich-Munchheide II, near Düsseldorf, Germany. If you would like to get information on the spot: We are looking forward to your visit.

Our international branches as well as our global distribution partner network are also always at your service: If you wish to get information on location we would look forward to meeting you there. Please contact us to arrange an appointment.

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