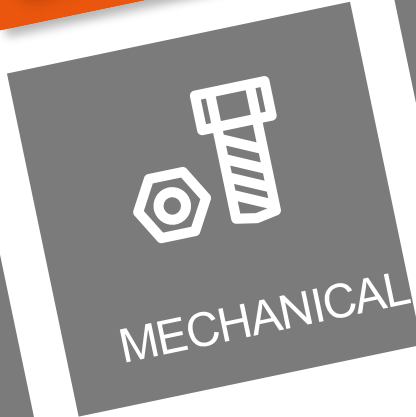
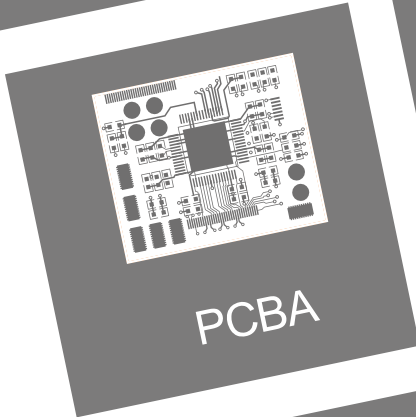
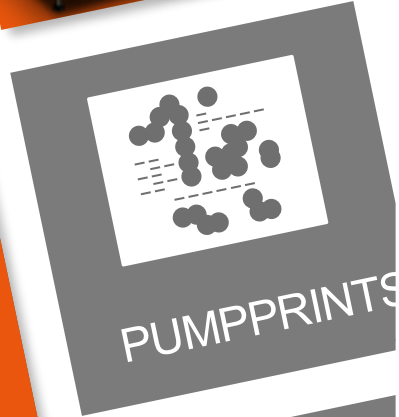
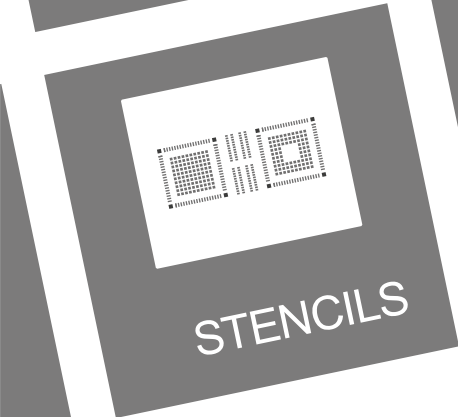
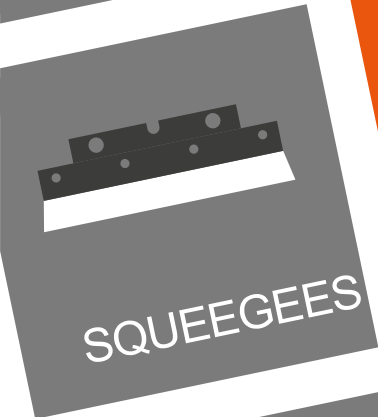
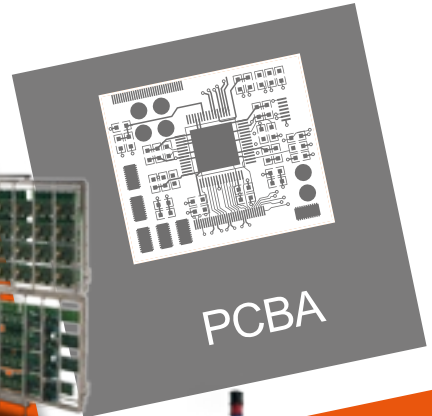
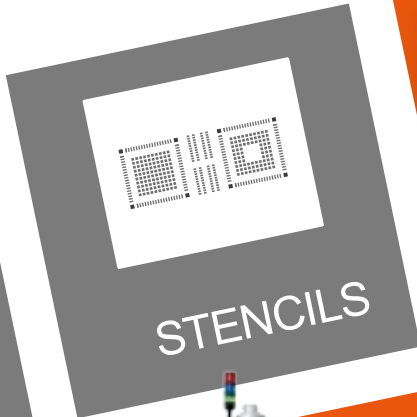
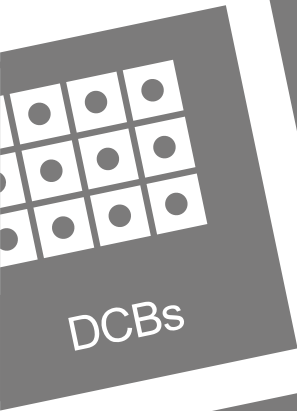




PRECISE **CLEANING** SOLUTIONS

FOR ELECTRONIC ASSEMBLY



www.pbt-works.com

PBT WORKS CLEANING MACHINES

PROVIDING PRODUCT RELIABILITY SINCE 1992

WHY TO CLEAN ELECTRONICS?

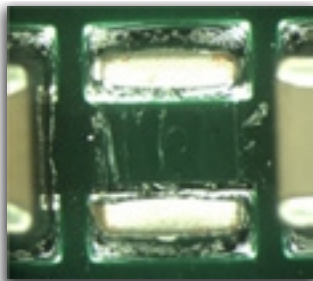
- Assure reliability of electronic assemblies
- Prolong the lifetime of PCBA

- Remove corrosive residues
- Improve surface insulation resistance
- Increase surface tension before coating and capsulation
- Remove foreign object debris from manufacturing

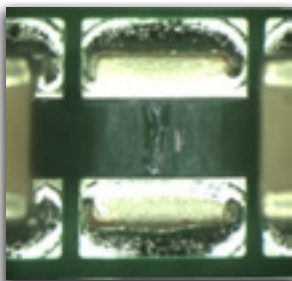
WHY TO CLEAN PRODUCTION TOOLS?

- Guarantee high quality stencil print
- Ensure quality and efficient soldering process

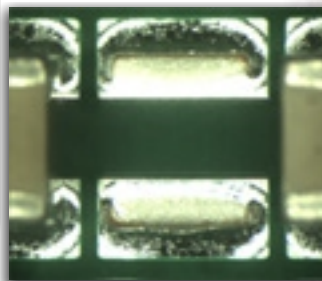
NOT CLEANED



HALF CLEANED



CLEANED



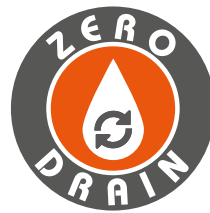
ABOUT PBT WORKS

- PBT was established in 1992
- More than 1150 installations worldwide
- Over 70 employees
- 2500 m² of company facility
- ISO 9001 and ISO 14001 certification for production and design
- Extensive experience with most challenging cleaning projects
- State of the art cleaning evaluation test & process recommendation
- Collaboration with world-class providers of cleaning media
- Close collaboration with universities and research institutes
- Own design team converts research ideas into the most up-to-date equipment
- Complete in-house mechanical, hardware and software design
- Flexibility to meet specific customer requirements
- Global sales and service network of over 50 partner companies

UNIQUE FEATURES OF OUR SYSTEMS



Vertical spray bars
Linear movement
The highest orthogonal spray impact
Balanced spray
No shadows
No blind corners
No stencil bending
Best for low stand-off components



Closed loop wash system
Instant filtration
Fully separated processes
No drain after cycle needed
Low drag over
Low liquid consumption



Vertical spray bars
Synchronized rotation
Constant speed
Orthogonal spray impact
No stencil bending
No shadows
Mitigated blind corners



Closed loop rinse system
Continuous water regeneration
Filtration by Carbon and Mixbed
Cleanliness control by resistivity
Short rinse time



Horizontal spray bars
Parts swing between bars
Tangent spray impact
Uniform cleaning of entire area
High volume cleaning



Online concentration measuring
Dosing from concentrate
Automatic concentration adjustment
Automatic care of tank level
Stable chemical process
Operator influence eliminated



Vertical heated air knife
Linear movement or rotation
Orthogonal blow-off effect
Constant speed
No stencil bending
Rapid drying of complex parts



Data logging of all parameters
Bar code reader
LAN connectivity
Full traceability of each single part



Heated chamber
Reduced pressure
Boiling point at 85°C
Accelerated drying
Dry gaps under components
Dry open components



Fully automatic transloader
Any sequence of processes
Unique lid handling
Basket buffers
Barcode control
High throughput
Operator influence eliminated



Double sided ultrasonic
40 kHz to 160 kHz
Automatic frequency sweep
Amplitude power control
Gentle to sensitive components



Harmonic basket oscillation
Uniform exposure of ultrasonic
Accelerated wash and rinse



Patented double flow
Primary flow in pump loop
Secondary vortex in the chamber
Uniform cleaning of entire batch



Air distributed by pattern of nozzles
Soaking of heavy contaminated parts
Gentle alternative to ultrasonic



CLEANING MACHINES OVERVIEW

	SuperSWASH		
	Single	Twingo	Single
Usable space of chamber: W x L x H (mm) (W-left/right, L-front/back, H-height) Including fixtures and clamping	835 x 80/150 x 815	2x 835 x 50 x 740	890 x 215 x 850
Usable space of standard clamping: W x L x H (mm) (W-left/right, L-front/back, H-height)	740 x 80/150 x 772	2x 740 x 50 x 695	780 x 215 x 750
PCBA, HDI, DCB, BGA, PoP, SiP, CSP, BTC, QFN, MELF hybrids, etc.	✓	✓	✓
Eurocards pcs/cycle (100 x 160 mm)	20	40	20
Cycle time/min	20 - 40	20 - 40	20 - 40
Metal & plastic stencils (paste, glue)	✓	✓	✓
Stencils/pcs/cycle	1	2	1
Cycle time/min	7 - 10	7 - 10	7 - 10
Maintenance parts from soldering process (solder pallets, filters, carriers, etc.)	✗	✗	✗
Solder pallets/pcs/cycle 500 x 500 x 40 mm (other sizes optional)	✗	✗	✗
Cycle time/min	✗	✗	✗
Cleaning agent volume (RtU)	66 l	66 l	80 l
Max cleaning temperature	60 °C	60 °C	60 °C
Max rinsing temperature	40 °C	40 °C	40 °C
Max drying temperature	110 °C *	110 °C *	110 °C
Machine dimensions W x L x H (mm) (W-left/right, L-front/back, H-height)	1700 x 1300-1500 x 1735	1700 x 1300-1500 x 1735	1900 x 1500 x 2100
Machine weight without liquid	520 - 630 kg	520 - 630 kg	1000 kg

Actual configuration and features may vary depending on design and innovation

* 100 °C for 120 V power supply

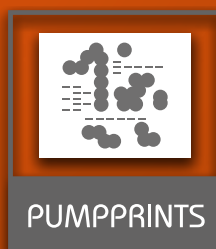
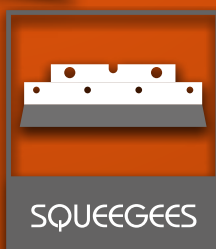
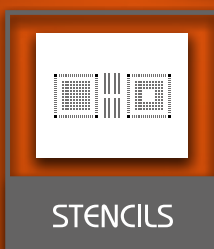
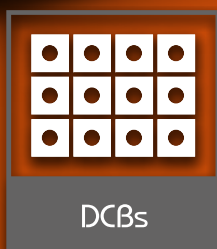
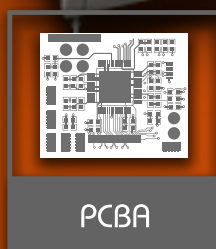
SINGLE CHAMBER				MULTI CHAMBER
HyperSWASH		MiniSWASH	CompaCLEAN	FluxCLEAN SD
Twingo	Combo			
2x 890 x 80 x 850	3x 890 x 315 x 170 or 2x 890 x 315 x 300	820 x 60 x 740	480 x 500 x 500	500 x 750 x 435
2x 740 x 80 x 695	3x 726 x 260 x 165 or 2x 726 x 260 x 300	740 x 60 x 695	430 x 490 x 500	customized
✓	✓	✓	✓	✗
40	112 / 168	20	140	✗
20 - 40	20 - 40	20 - 40	30 - 60	40
✓	✗	✓	✗	✗
2	✗	1	✗	✗
7 - 10	✗	10 - 15	✗	✗
✗	✗	✗	✓	✓
✗	✗	✗	6	2 / 4
✗	✗	✗	20 - 40	40
80 l	80 l	70 l	80 l	163 l
60 °C	60 °C	60 °C	60 °C	room
40 °C	40 °C	40 °C	40 °C	room
110 °C	110 °C	90 °C	110 °C	room
1900 x 1500 x 2100	1900 x 1500 x 2100	1600x800x1200 (I, II) 1600x1400x1200 (optional 1600) (III)	940 x 1700 x 2140	1650 x 1065 x 1100
1000 kg	1000 kg	220 - 450 kg	455 - 485 kg	145 kg





CLEANING APPLICATION

Defluxing - removing soldering residues after reflow
 Cleaning contamination from handling and board manufacturing, removing FOD
 High density electronic assemblies with low standoff components like BGA, CSP, BTC, QFN, MELF, small chips
 Cleaning of power electronics
 Electronic assemblies requiring extra short process time
 Second side misprints on complex assemblies
 Cleaning before conformal coating and wire bonding
 High volume stencil cleaning



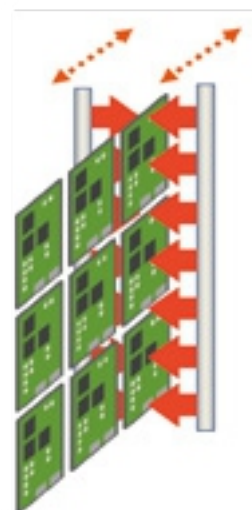
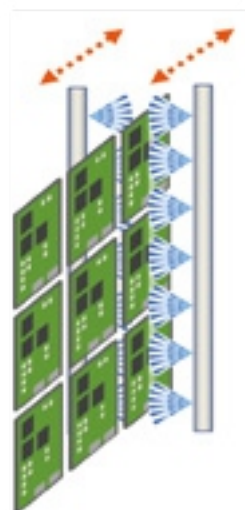
UNIQUE FEATURES

Fully automatic spray-in-air closed loop zero drain system
 Double capacity configuration TWINGO
 Linear direct spray for equal washing of entire surface
 Compatible with wide range of chemistry from various suppliers
 100% filtration of entire spray volume
 Optional triple rinse
 Hot air knife direct dry technology
 Double flow exhaust fan or exhaust flap - system controlled
 Illuminated glass door chamber for visual process control
 All process steps with up to 5 substeps for highest flexibility
 Wide range of standard and customized PCBA fixtures
 Clamping for all types of stencils
 Anti-collision sensor
 Up to 3 fully separated liquid loops
 Low consumption of chemicals and water
 Proportional level sensors in all processes
 Outstanding options of water utilization



Linear Direct Spray Bars

Linear Direct Air Knife



CONTROL FEATURES

Intuitive touchscreen interface with Windows OS
 Adaptive rinse water quality control
 Dosing of up to 2 additives
 AAD Automatic adaptive dosing with concentration sensor
 ZESTRON® EYE or KYZEN ANALYST™, integrated in machine OS
 Complete datalogging, LAN connectivity
 Bar code traceability
 Personalised password security
 Multi language selection

UNIVERSAL CLEANING SOLUTION IN ONE SYST

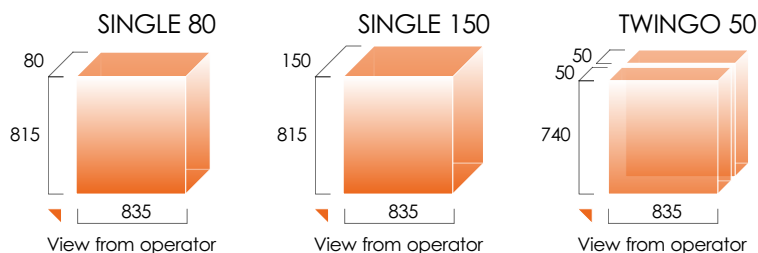
CAPACITY AND SIZE OPTIONS

SINGLE – single frame
TWINGO – double frame

Modification between options in 10 minutes

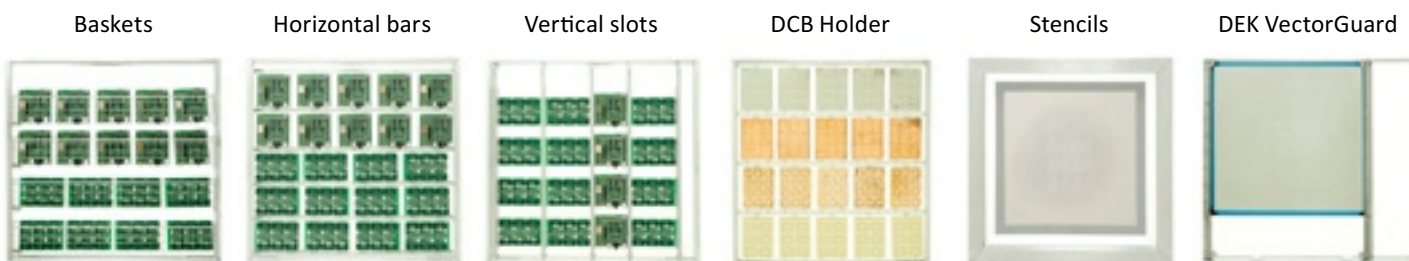
USABLE SPACE OF CHAMBER

Including fixtures and clamping



CLAMPING OPTIONS

Wide range of standard fixtures and adaptors for any types of PCBAs and stencils
Customization is available for any clamping fixtures
Framed stencils fit right into the machine chamber



VERSIONS BY APPLICATION

SuperSWASH II Wash + Rinse + Dry

SuperSWASH III Wash + Rinse I + Rinse II + Dry

SuperSWASH IV Wash + Rinse I + Rinse II + Rinse III + Dry

stencils, squeegees, misprints, PumpPrint™ stencils

PCBA after soldering, PCBA before coating

power electronics, prior to wire bonding

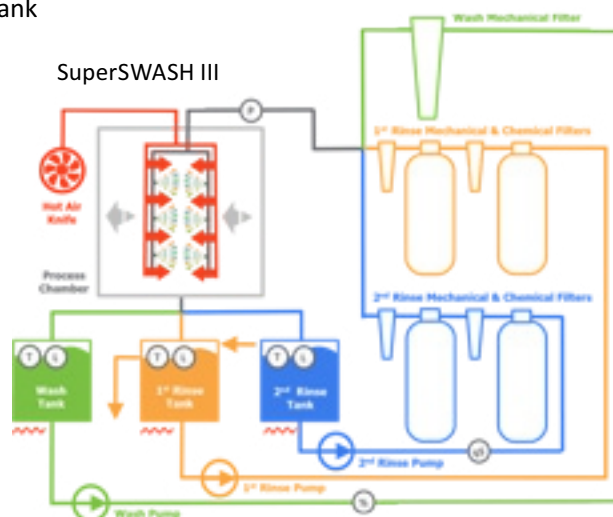
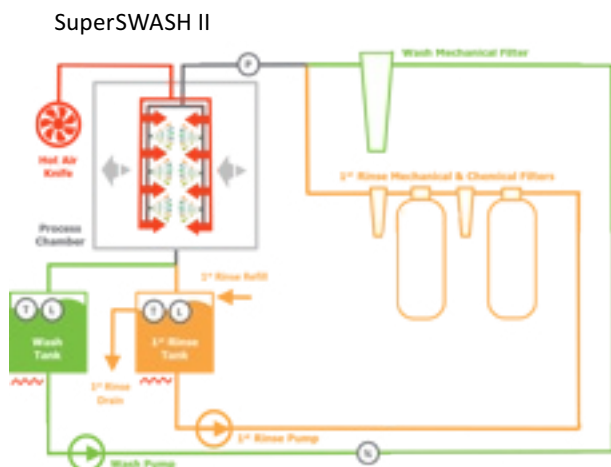
FILTRATION OPTIONS

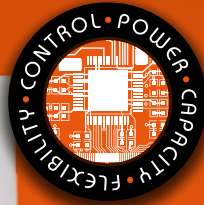
First rinse filtration fully separated from second rinse filtration
Integrated 16l chemical filters

External carts with up to 39l of mixbed and 39l active carbon

Cascade filtration regularly refills fresh DI water from external source to second rinse tank

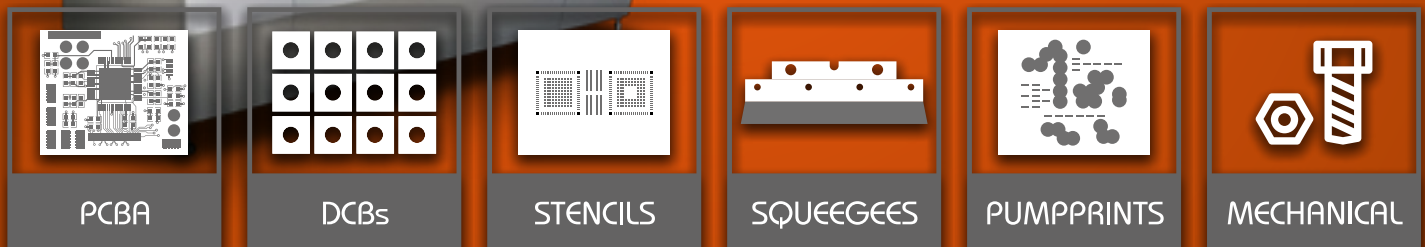
External source regularly refills fresh DI water into first rinse tank





CLEANING APPLICATION

Defluxing – removing all kind of solder residues
 Cleaning of micromechanical components
 Cleaning contamination from handling and board manufacturing, removing FOD
 Highly populated electronic assemblies with low standoff components such as BGA, CSP, BTC, QFN, MELF
 Cleaning of power electronics
 Electronic assemblies requiring extra short process time
 Second side misprints on complex assemblies
 Cleaning before conformal coating and wire bonding



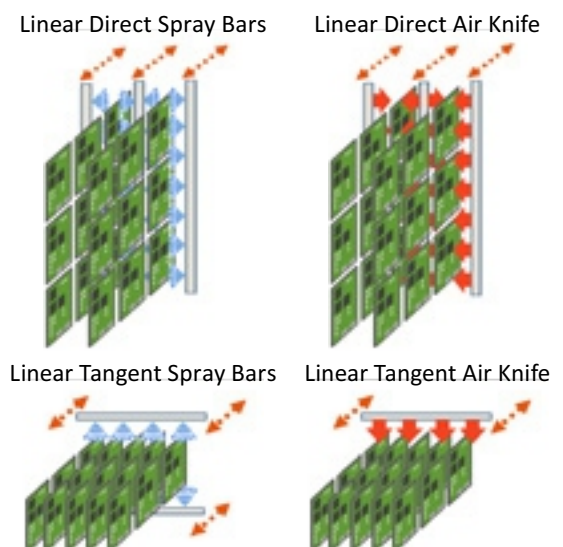
UNIQUE FEATURES

Fully automatic spray-in-air closed loop zero drain system
 Double capacity configuration TWINGO
 Multiple capacity in COMBO configuration
 Linear direct spray for equal washing of entire surface
 Compatible with wide range of cleaners from various manufacturers
 100% filtration of entire spray volume
 Two separate rinse loops
 Possible to use two different cleaners
 Hot air knife direct dry technology
 Illuminated glass door chamber for visual process control
 All process steps with up to 5 substeps for the highest flexibility
 Wide range of standard and customized PCBA fixtures
 Clamping for all types of stencils
 3 separate liquid loops with possible cascade in rinse loops
 Low consumption of chemicals and water
 Proportional level sensors in all processes
 Outstanding options of water utilization



CONTROL FEATURES

Intuitive touchscreen interface with Windows OS
 SPC for all parameters in graphical interface – trends, limits
 Adaptive rinse water quality control
 AAD Automatic adaptive cleaner dosing with concentration sensor ZESTRON® EYE or KYZEN ANALYST™, integrated in machine OS
 Dosing of up to 2 additives
 Complete datalogging, LAN connectivity
 Bar code traceability
 Unlimited recipe library
 Personalised password security
 Multi language selection



UNIVERSAL CLEANING SOLUTION IN ONE SYST

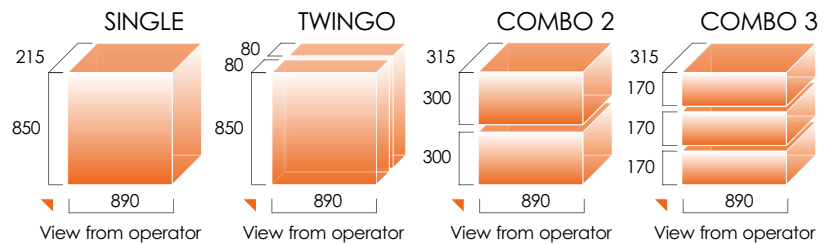
CAPACITY AND SIZE OPTIONS

SINGLE – single frame
TWINGO – double frame
COMBO – multi-level basket

Modification between options in 10 minutes
Custom designed nozzle system available

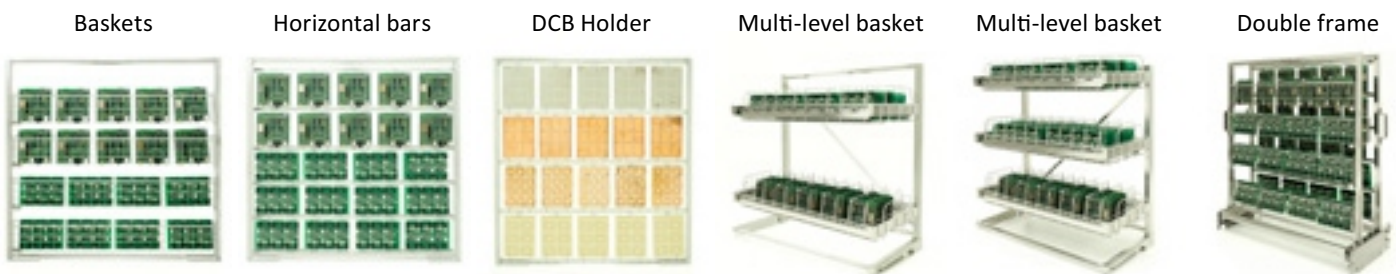
USABLE SPACE OF CHAMBER

Including fixtures and clamping



CLAMPING OPTIONS

Wide range of standard fixtures and adaptors for any types of PCBAs and stencils
Customization is available for any clamping fixtures
Adapter for framed stencils



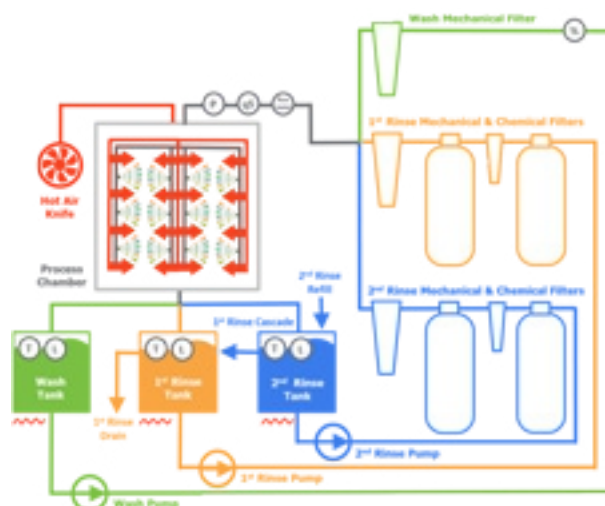
VERSIONS BY APPLICATION

HyperSWASH Wash + Rinse I + Rinse II + Dry

PCBA after soldering, PCBA for coating,
power electronics, micromechanics

FILTRATION OPTIONS

Zero drain concept - close loop, cascade or open loop can be set by software only
Special filtration strategy for the highest flow
First rinse filtration fully separated from second rinse filtration
External carts with up to 39l of mixed bed and 39l active carbon



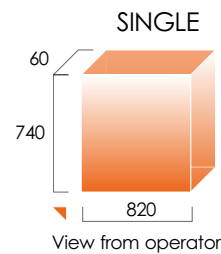
PRICE-EFFECTIVE, POWERFUL, RELIABLE SOL

CAPACITY AND SIZE OPTIONS

SINGLE – single frame

USABLE SPACE OF CHAMBER

Including fixtures and clamping



CLAMPING OPTIONS

Conventional framed stencils and screens fit directly into the built-in adjustable clamping
Wide range of standard fixtures and adaptors for other types of stencils and PCBAs
Customization is available for any clamping fixtures

Framed stencils



Plain stencil holder



DEK VectorGuard



Squeegee Holder



Baskets



Horizontal bars



VERSIONS BY APPLICATION

MiniSWASH I

Wash + Dry

stencils, screens, squeegees, PumpPrint™ stencils

MiniSWASH II

Wash + Rinse + Dry

PCBA, stencils, screens, misprints, squeegees, PumpPrint™ stencils

MiniSWASH III

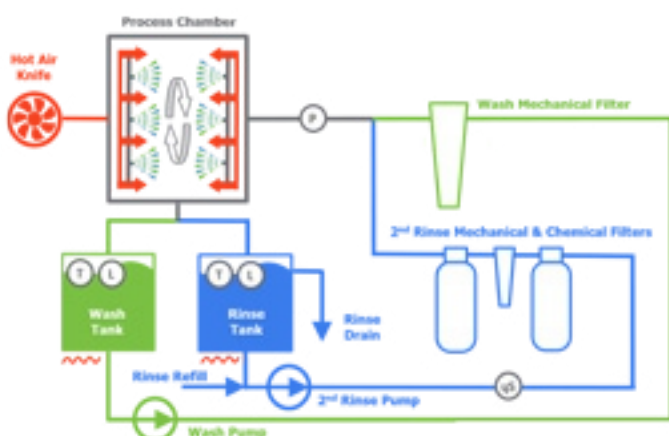
Wash + Double Rinse + Dry

PCBA after soldering, PCBA before coating

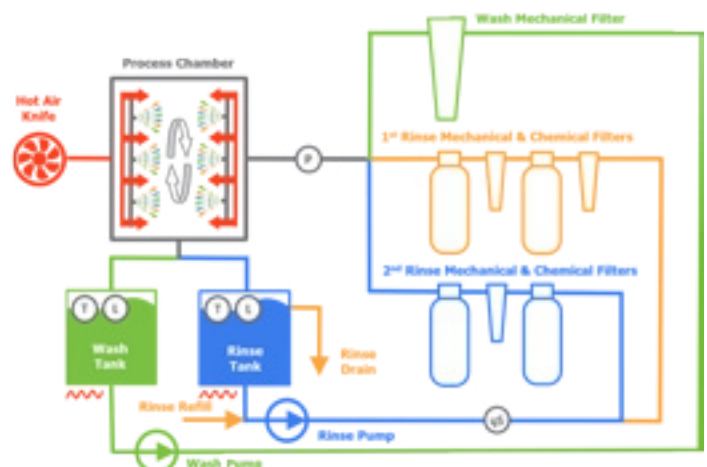
FILTRATION OPTIONS

Easily connected to water supply and drain
External filter carts with up to 25l mixed bed and 25l active carbon
Optional double rinse

MiniSWASH II



MiniSWASH III



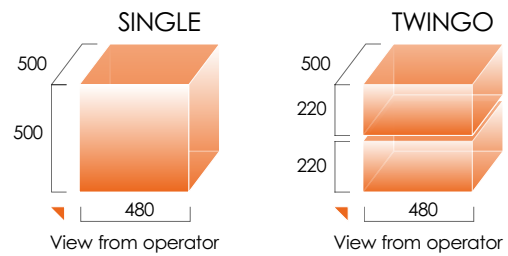
HIGH CAPACITY AND LOW PROCESS COST

CAPACITY AND SIZE OPTIONS

SINGLE – single rack
TWINGO – double rack

USABLE SPACE OF CHAMBER

Including fixtures and clamping



CLAMPING OPTIONS

Wide range of standard fixtures for any types of PCBAs, electronic assemblies and soldering pallets
Customization is available for any clamping fixtures



VERSIONS BY APPLICATION

CompaCLEAN II Wash + Rinse I + Dry

CompaCLEAN III Wash + Rinse I + Rinse II + Dry

soldering pallets

PCBA after soldering, PCBA before coating

FILTRATION OPTIONS

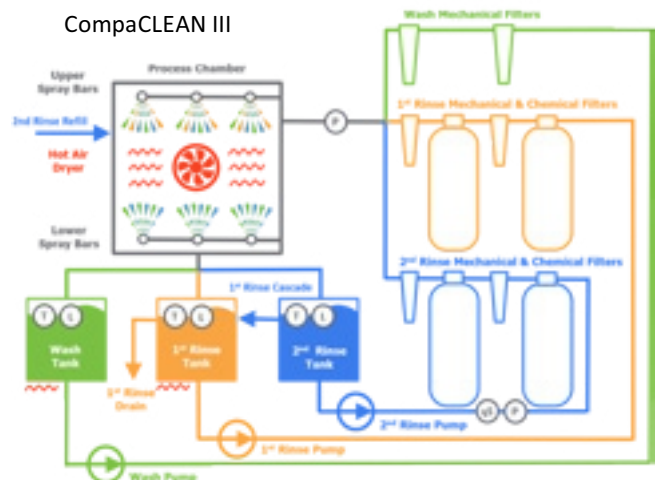
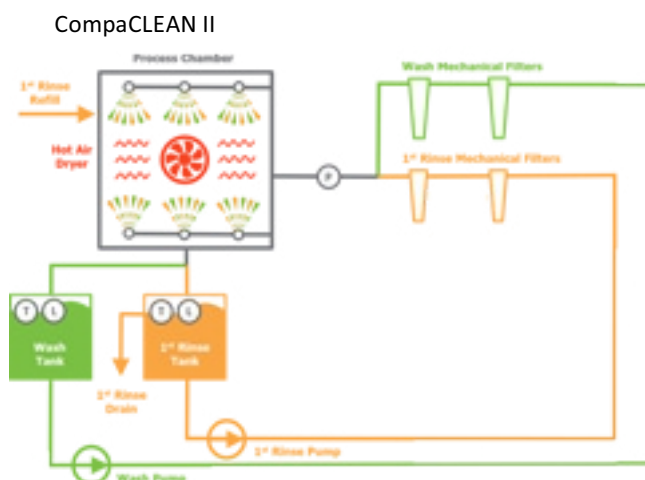
Integrated 16l chemical filters keep the machine footprint as small as possible

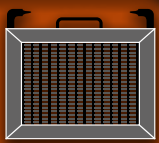
First rinse filtration fully separated from second rinse filtration

External carts with up to 39l mixed bed and 39l active carbon

Cascade filtration regularly refills fresh DI water from external source to second rinse tank

External source regularly refills fresh DI water into first rinse tank





FILTERS

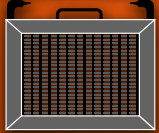


PALLETS



MECHANICAL

FluxCLEAN SD



FILTERS



PALLETS



MECHANICAL

CLEANING APPLICATION

Solder pallets
Filters from reflow ovens
Mechanical parts cleaning

UNIQUE FEATURES

Automatic spray-in-air closed loop system
Uniform spray coverage with oscillating rack
Fixed nozzle system
Powerful hot-air dryer
100% filtration

CONTROL SYSTEM

Touchscreen interface with Windows OS
Week program for automatic start-up
Personalised password protection
Multi language selection



CLEANING APPLICATION

Simple and cost effective solution
Solder pallets, condensation traps and other maintenance cleaning
Mechanical parts cleaning
Small and middle size production

UNIQUE FEATURES

FluxCLEAN SD (standard duty) - Polypropylene baths CLEAN – RINSE – DRY
FluxCLEAN HD (heavy duty) with metal baths available upon request
Air bubbling process in cleaning and rinsing baths
Baths dimensions and additional accessories can be modified upon customer request



DOSING SYSTEM FOR CLEANER AND ADDITIVES

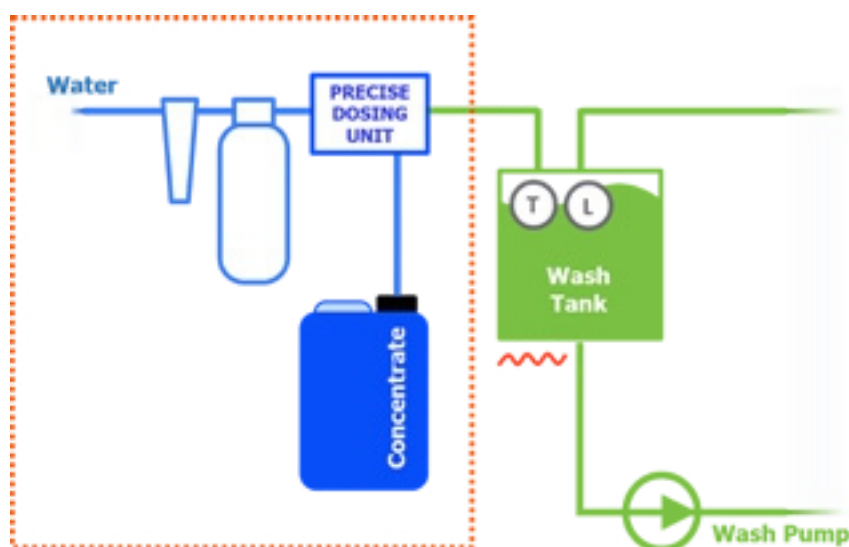


AAD - AUTOMATIC ADAPTIVE DOSING

Control and programming from main machine control system
Applicable for external control of wash process
Adaptive concentration control and dosing of cleaning agent
Integrated ZESTRON® EYE or KYZEN ANALYST™ management
Adaptable system ensures stable concentration of cleaner
Available for SuperSWASH, HyperSWASH, CompaCLEAN, UniCLEAN
DI water source integrated for diluting concentrate
Capable to dose up to 2 additional additives

KYZEN ANALYST™

ZESTRON® EYE
3P-Technology



PBT WORKS MACHINES WORK WITH VARIOUS CLEANING AGENTS

Water based solvents

Semi-aqua solvents

Saponifiers

Detergents

Majority of cleaning processes require dedicated, carefully selected cleaning agent. Cleaning applications demand perfect balance between chemical action and fluid mechanics.

PBT Works cooperates with leading global manufacturers of cleaning chemicals. Our machines are available for trials in several technical centers around the world. Up to date machine design knowledge and latest developments in cleaning chemicals are regularly shared between our engineers and partners to ensure optimal machine-chemical compatibility for the best cleaning results.

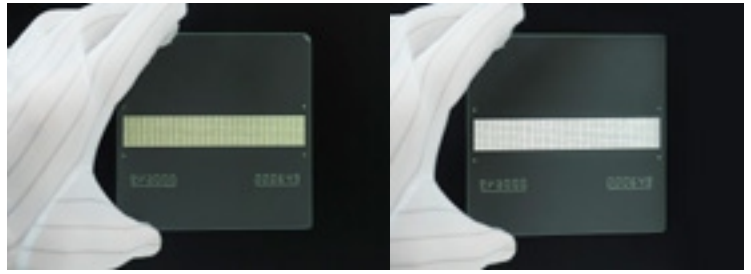
Cleaning agents today are sophisticated blends of many substances carrying out the challenging task of diluting wide range of organic residues while not attacking another group of very similar organic materials on assemblies and components.

PBT Works thoroughly tests durability of all potentially sensitive machine components using partners' cleaning agents to ensure long machine lifespan.

CLEANING PERFORMANCE TEST BY PBT GLASS TEST

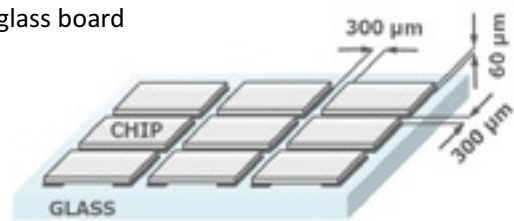
INTENDED FOR:

- Process qualification - flux /cleaner matching
- Process changes verification
- Machine capability studies
- Process capability studies
- Process optimisation



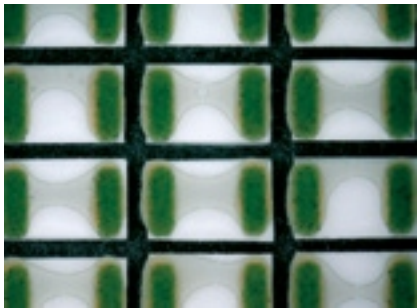
GLASS TEST BOARD FOR CLEANING RESULTS EVALUATION

- Transparent - easy evaluation of residual under chips thanks to glass board
- Stand-off 60 \pm 5 μ m
- 100x100 mm glass board
- Enables to interrupt, evaluate and continue in testing
- Reusable – up to 20 cycles
- Chips mounted by patented process

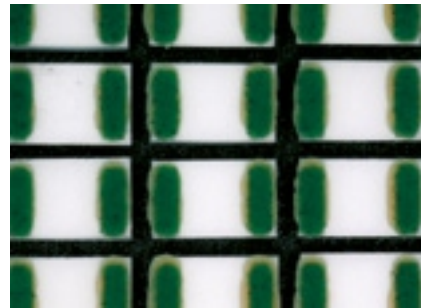


VISUAL EVALUATION

Easy and reliable evaluation by magnification only



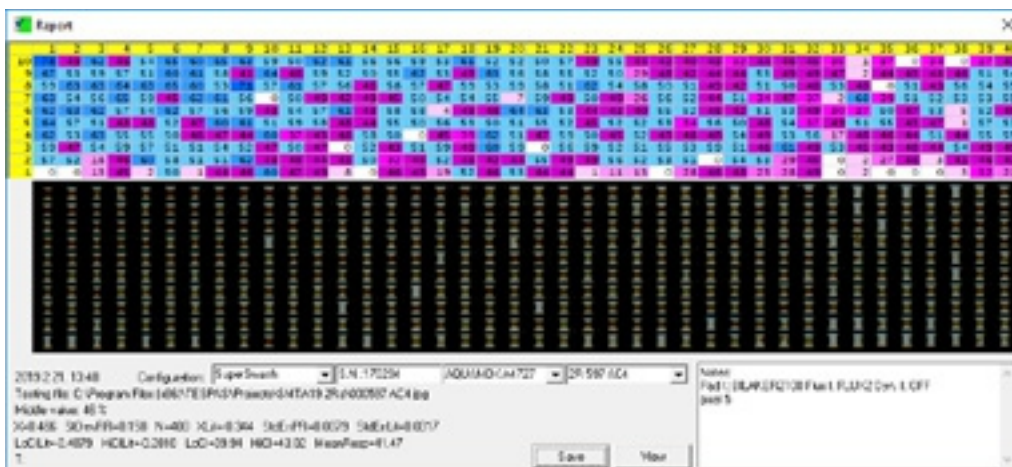
50% residues under chips



100% cleaned

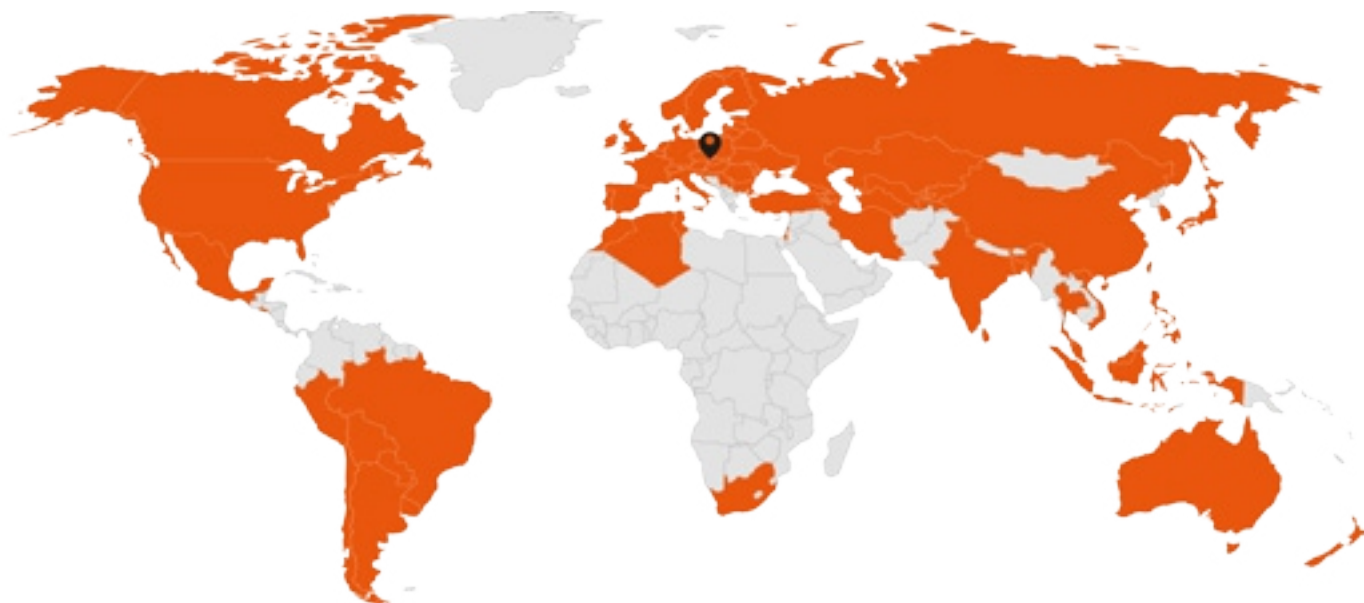
AUTOMATIC EVALUATION BY OPTICAL DIAGNOSTIC SYSTEM VERI

- Fast evaluation (<3 min.)
- Precise and repeatable results
- Easy and intuitive operation





GLOBAL SUPPORT WORLDWIDE REPRESENTATION



Think global, act local.

That is why we work with distributors and representatives. We support and provide our colleagues in many countries worldwide not only with technical information about machine details, but also with highly-valued knowledge of the whole cleaning process.

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We supply spare parts and consumables globally as well as provide service and consulting.

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