SWAT
Safewash Total

SWAT is a specially formulated blend of non-flammable solvents which forms a micro-emulsion when mixed with water. Designed for cleaning printed circuit boards, it is ideal for the safe removal of all types of paste, adhesive and flux residues, including no-clean. Supplied as a concentrate, SWAT contains a corrosion inhibitor allowing the safe cleaning of sensitive metals including copper and aluminium. SWAT is part of the Electrolube Safewash range; water-based, non-flammable, biodegradable solvent blends designed to clean to within military cleanliness standards, (ANSI-J-001B/IPC TM-650).

- Micro-emulsion with high solvency for removal of flux residues; ideal for stubborn deposits
- Low foaming action; suitable for use in pressure wash systems as well as ultrasonic equipment
- Supplied as a concentrate; allows versatility and control in the production process
- Non-flammable product, 100% ozone friendly; suitable for use in standard cleaning equipment

Approvals	**RoHS Compliant (2015/863/EU):**	**Yes**

Typical Properties (Concentrate)	Appearance	Clear, colourless liquid
	Boiling Point (°C)	>160
	Flash Point (°C)	Non-flammable
	Freezing Point (°C)	<-50
	Density @ 20°C (g/ml)	0.93
	Viscosity @ 20°C (mPa s)	40
	pH	11
	Conductivity @ 18°C (mS)	<0.2

Description	Packaging	Order Code	Shelf Life
Safewash Total	5 Litre Bulk	SWAT05L	48 Months
Safewash Defoamer	1 litre Bulk	SWD01L	24 months
	5 litre Bulk	SWD05L	24 months

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Electrolube cannot be held responsible for the performance of its products within any application determined by the customer, who must satisfy themselves as to the suitability of the product.

Ashby Park, Coalfield Way,
Ashby de la Zouch,
Leicestershire LE65 1JR
T +44 (0)1530 419 600
F +44 (0)1530 416 640
BS EN ISO 9001:2008
Certificate No. FM 32082

Directions for Use

Safewash Total is a low foam cleaner, suitable for use in dishwasher and in-line pressure systems, as well as Ultrasonic and spray under immersion applications. In the event that contaminants to the cleaning solution cause foaming during use, additions of Safewash Defoamer (SWD) can be made as necessary.

Spray application

For a typical application, Safewash Total should be diluted to 20% with de-ionised water and applied for a wash time of 5-10 minutes at 40-60°C. The specific cycle required will be dependent on the age and type of residue being removed, the re-flow profile and the effectiveness of the cleaning machine. The cleaning stage should be followed by a de-ionised water rinse and a drying stage. The length of time required for rinsing and drying the PCB depends on the circuit design and the efficiency of the rinsing/drying unit. Air-knives can be used as an optional extra to reduce temperature or total energy required.

A typical cycle using a Miele 6002 Industrial Washer:

1. Cleaning, Safewash Total diluted to 20% v/v, at 50°C for 10 minutes
2. Mains water rinse, 1 minute at 40°C
3. De-ionised water rinse, 3 minutes at 70°C
4. Hot air dry, 15 minutes at 115°C

Once cooled to below 30°C the residues and soils will precipitate and can be filtered out of the cleaning solution, extending the life of the cleaner. Typically a 50-75 micron cotton wound filter would be suitable.

Ultrasonic and spray under immersion application

Application Temperature:	Typically 30-40°C
Application Concentration:	Typically 15%

For immersion applications, Safewash Total should be diluted with de-ionised water to typically 15%. The cleaning time will depend on the nature of the residues and the process temperature but is typically 5-15 minutes. The wash stage should be followed by thorough rinsing in de-ionised water and drying.

Solution Control

There are a number of methods that can be used to monitor the concentration of the cleaning solution and the level of contamination. The suitability of the methods will depend on the specific application; they can be affected by type of residue being removed by the cleaner, the quality of the water used to make the solution and also the effectiveness of the filtration system. Cleaning efficiency in the application should be monitored and the cleaning solution replaced as necessary. The following graphs provide some starting points for monitoring solutions of SWAT.

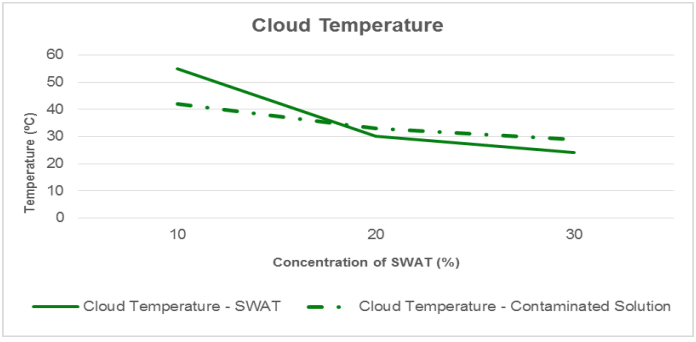
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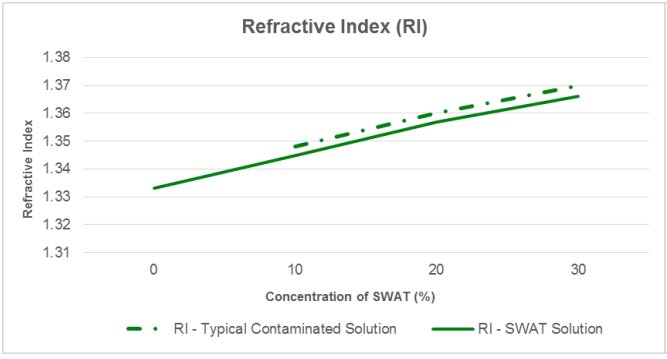
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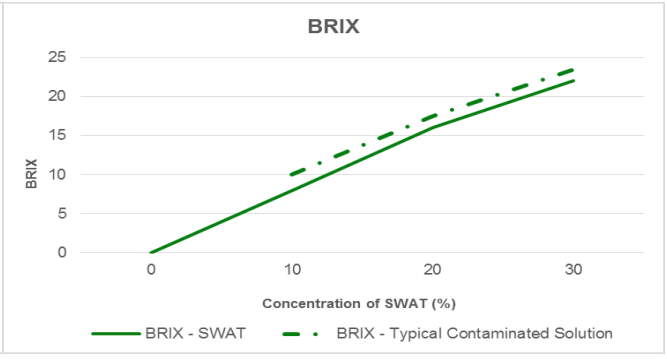
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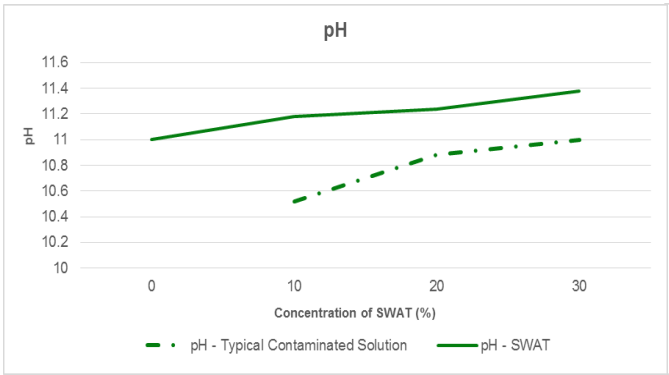
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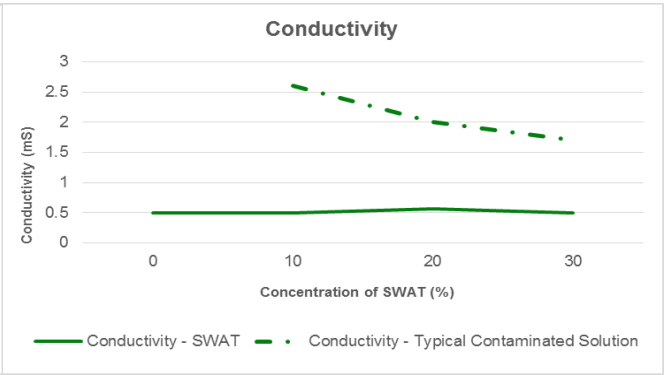
The cloud temperature can be measured by gently heating a sample of solution from ambient and noting the temperature at which it becomes cloudy. Refractive index (or BRIX) is a simple test for solution control. Small hand held refractometers can be purchased from suppliers such as Bellingham and Stanley, at a low cost. Both pH and conductivity are also valid methods for solution control however the change with increasing contamination uptake will depend on the residues removed. In all cases, the method for solution control should be evaluated in the specific application.











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