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Electronic and General Purpose Cleaning

Technical Data Sheet

ELECTROLUBE
THE SOLUTIONS PEOPLE

SWAS
Safewash Super

SWAS is ideally suited for the removal of very stubborn flux resides and no-clean fluxes, which can be extremely difficult to remove. SWAS will remove them to military cleanliness standards. It is ready to use and also contains a corrosion inhibitor for use with sensitive metals. It also has a lower odour than the other Safewash variants and is easy to rinse. SWAS 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).

- Removes all types of flux residues; ideal for cleaning very stubborn deposits
- Offers enhanced cleaning performance to SWAJ; for more efficient cleaning processes
- Ready to use for ultrasonic applications; no dilution required
- Non-flammable product, 100% ozone friendly; suitable for use in standard cleaning equipment

Approvals	**RoHS-2 Compliant (2011/65/EU):**	**Yes**
Typical Properties	Appearance	Blue Liquid
	Boiling Point (°C)	98
	Flash Point (°C)	None
	Freezing Point (°C)	-5
	Density @ 20°C (g/ml)	1.02
	Viscosity @ 20°C (mPa s)	5-10
	pH	11.7
	Conductivity @ 18°C (mS)	1.4

Description	Packaging	Order Code	Shelf Life
Safewash SWAS	5 Litre	SWAS05L	48 Months
	25 Litre	SWAS25L	48 Months
	200 Litre	SWAS200L	48 Months
	1000 Litre	SWAS1000L	48 Months

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Directions for Use

SWAS has been specifically developed for use in 3 or 4 stage batch cleaning systems using ultrasonic or spray-under-immersion. It is supplied at a concentration suitable for immediate use and further dilution is not recommended. In typical usage times and temperatures, SWAS has excellent compatibility with most materials used in the electronics industry, and with materials used in cleaning equipment. For sensitive plastics such as polycarbonate and ABS, testing is recommended to confirm compatibility.

Stage 1 - Cleaning: Typically 3-5 minutes with agitation. Safewash is designed to be used at ambient temperature, though if required this can be increased up to 45°C.

Stage 2 – Tap water rinse: The temperature of the rinsing solution can be ambient, but higher temperatures in addition to agitation, will accelerate and improve rinsing.

Stage 3 – Deionised water rinse: This may either consist of a re-circulating rinse or a spray system that is activated when the PCBs leave the tap water rinse. If military standard cleanliness is not required, this deionised rinse may not be necessary, though the PCBs may show some white streaking due to tap water impurities.

For ferrous metal cleaning operations it is possible to add a rust inhibitor (Code: SRIA) at 0.5% into this stage. This will prevent flash rusting of ferrous metals when they are dried at high temperatures.

Stage 4 – Drying: The length of time required to dry the PCB depends on the circuit design and the efficiency of the drying unit itself. This is enhanced by equipment that uses high air flow as opposed to 'heat only' systems. In general, this stage takes approximately 5 minutes at 90°C. Air-knives can be used as an optional extra to reduce temperature or total energy required.

Evaluation of Flux Concentration - Conductivity Method

The electrical conductivity of a Safewash solution will increase with flux concentration (and other ionic contaminants). Once it has been determined how much flux the Safewash can take up, while still achieving the cleanliness level required, the method below can be used to determine a method for monitoring the solution.

Whilst conductivity and other methods may be used to assess the contamination level, the critical test for replacement is when the process is not cleaning the boards to the desired standards.

A range of flux / Safewash solutions should be made up at 0.5, 2.5, 5, 7.5, 10 and 15%.

For solder pastes, thoroughly mix 100g of the paste with 100g of Safewash. Heat the mixtures to 50°C for 4 hours. Cool to room temperature and measure the conductivity of the liquid at a suitable fixed temperature. If the flux content of the paste is 10%, this gives a figure for the 10% flux in Safewash. Serial dilution of this master solution will allow a graph of conductivity/ concentration to be prepared.

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For wave solder fluxes, take 150ml of a 10% flux and evaporate to ca. 50ml. (CARE - solvent is usually highly flammable). Dissolve this material in 100ml of Safewash to give a standard 15% solution. Measure conductivity at 20°C and construct a graph. In production, the conductivity of the cleaning solution may now be monitored. When the conductivity indicates flux levels of 10-15%, or a concentration above which Safewash does not clean to an acceptable level, the bulk material should be replaced.

As an alternative, pH, refractive index or titration are also suitable methods for monitoring the contamination level in Safewash.

Estimated SWAS usage

Usage will depend greatly on PCB design, however the it can be estimated from the concentration of flux used and the size/number of boards cleaned. The table below lists the typical amount of contamination expected on a PCB.

Flux Concentration	Contamination per square metre of PCB
20%	11 - 13 grams
10%	5 - 8 grams
5%	2 - 5 grams

SWAS will absorb a maximum of 5% - 15% of its weight of flux while still cleaning to military standards.

In addition to the SWAS that it is used to absorb the flux, small amounts of cleaner will remain on the board and be transferred into the rinse stage. This is commonly known as drag-out, which typically results in loss of around 100ml/m^2 of board cleaned.

Additional Information

Safewash has been tested and approved by both military and commercial electronics manufacturing companies across the world. The British Ministry of Defence (Directorate General of Defence Quality Assurance) have tested Safewash on various fluxes and have found that the product cleans to well within Defence Standard 00-10 (and it performed approximately 10 times better than 1.1.1. Trichloroethane based solvents).

Siemens Central Research Laboratories in Erlangen agreed with these findings. Their conclusions were:
"The residual contamination found on the circuit boards and components after cleaning with Safewash 2000 is significantly below the limit value of 1.56 micrograms NaCl/cm^2 permitted by MIL-P28809A. From the point of view of a high level of cleaning efficiency, the bio-cleansing agent "Safewash 2000" can be released for cleaning purposes in electrical engineering".

Disposal

The contamination levels after a single use are normally low enough to allow the solution to run directly to the drain or recycled through a carbon filter; this will prevent the rinse water becoming progressively more contaminated. The local water authority should be consulted for confirmation of this. Similarly, the rinse water can usually be run to the drain. Experience shows that a flow rate of approx. 20 litres per square metre of PCB cleaned produces water with acceptable levels of contamination. The use of a carbon filter, through which the tap water is permanently re-circulated, produces no liquid waste.

Revision 1: Oct 2013

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