

## LIQUID FLUX WF300F, WF300S

VOC-free and no-clean. High activity, Special Low Solder-Balling Formula

### DESCRIPTION

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Stannol WF300F and WF300S are low residue, resin and halide-free fluxes, which meet the most demanding legislation on volatile organic compound (VOC) emissions.

### CHARACTERISTICS

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Stannol WF300F/S offers the following advantages:

- **No-clean**
- **Highly effective on low solderability surfaces, e.g. oxidised copper**
- **Formulated to minimise solder balling**
- **Non-flammable formulation - <1% VOC - meets US air quality legislation**

### APPLICATION

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Stannol WF300F/S are designed mainly for consumer electronics applications using either conventional or nitrogen inerted wave soldering machines. These fluxes perform well, even when used on poorly preserved copper substrate. They have been designed to minimise the effect of solder balling between adjacent pads.

### RECOMMENDED OPERATING CONDITIONS

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**The Printed Circuit Board:** Stannol WF300F/S have been formulated for high activity on oxidised copper and can be used in conjunction with most commonly used surface preservative materials. It is recommended that process compatibility testing be carried out prior however. Testing during the development of these fluxes confirms good PTH penetration and therefore good topside fillet formation.

**Machine Preparation:** Ensure the soldering machine is thoroughly cleaned, including all fingers, pallets and conveyors, so that any possible contamination has been removed. Stannol Flux-Ex 200B can be used in the finger cleaners. Stannol WF300F/S are not aggressive towards most plastics.

**Fluxing:** Stannol WF300S has been formulated for use in spray or wave fluxers and WF300F has been formulated for use in foam fluxers only. The upper limit for flux coverage to ensure that soldered PCBs pass cleanliness tests is 40g/m<sup>2</sup> of circuit. WF300F is formulated to have the same foaming properties as conventional low solids liquid fluxes. As it is water based, the foam is therefore less prone to destabilisation through evaporative loss and contact with hot fixtures. Also there is no requirement for the air to be dry.

Observing the following instructions will help ensure optimum foaming and soldering results:

1. Keep the flux tank FULL at all times.
2. The top of the foaming stone should be no more than 20mm below the surface of the liquid flux. The level of the stone should be raised if this is not the case.
3. The foam fluxer should taper towards a slot width of 10 - 20mm.
4. DO NOT use fixtures which can entrap the flux. This may lead to random solder balling caused by the sudden volatilisation of the excess flux upon contact with the solder wave.

**Flux Control:** Since loss of solvent by evaporation is slow and moisture absorption does not occur, flux maintenance is simpler than for alcohol formulations. Density measurements do not give a reliable guide to flux activity since changes are small and difficult to detect. The Stannol Mini-Titration-Kit is recommended for routine control at the production line.

**Note:** WF300F may appear cloudy after being exposed to higher temperatures. WF300S may also exhibit cloudiness but to a lesser extent due to the special formulation. This does not affect the performance of the flux. Both fluxes should not be stored below +10°C (longtime-storage). For a short time +5°C is possible. Lower temperatures may cause the solids in the flux to separate from solution. In case this happened anyway, you can try to restore the flux to normal by consistently stirring and heating it to room temperature

**Preheating:** As both Stannol WF300F and WF300S contain water, it may be necessary to adjust the preheater setting to ensure the water is sufficiently evaporated prior to the PCB entering the solder wave, and to ensure that the flux has reached the required activation temperature (see topside pre-heat table below). The optimum preheat temperature for a PCB depends on its design and the thermal mass of the components used, but the cycle should be mass of the components used, but the cycle should be sufficient to ensure that the flux coating is not visibly wet when it contacts the wave. Preheat vs conveyor speed combinations which have given good results are shown below.

<b>Conveyor Speed:</b>	m/min.	1.3	1.5
<b>Topside Preheat</b>	[°C]	110	120

Fitting a topside canopy over the preheater/s can help to produce more effective drying and activation. This will allow the use of faster conveyor speeds and improved soldering.

**Wave Soldering:** Excess moisture on the PCB during soldering may lead to random solder balling and poor wetting of some solder joints. IT IS IMPORTANT that the flux solvent carrier (water) is fully evaporated and that the PCB appears virtually dry when it reaches the solder wave. At a speed of 1.5m/min, a contact length of 38-50mm between the wave and the PCB is recommended, which would mean a contact time of approx. 1,5-2,5 sec. At lower speeds, this contact length should be reduced. Very long contact times may produce dull solder joints.

For accurate preheat and peak temperature measurements when setting up a wave solder machine, and consistent process monitoring the Stannol Thermologger 5000 temperature profile system is ideal.

**Solders:** Stannol WF300F and WF300S fluxes can be used with all standard solder alloys. The recommended maximum solder bath temperature is 260°C. The solder bath temperature can generally be reduced when compared with processes using conventional fluxes. Temperatures as low as 235°C may be used in some situations and this results in improved soldering and less wastage through solder bath dressing. Dwell time on the wave should be 1.5-2.5 seconds.

## PHYSICAL PROPERTIES AND DATA

GENERAL PROPERTIES	WF300F foam	WF300S spray
<b>Colour<sup>(1)</sup>:</b>	colourless/yellow	
<b>Solids content:</b>	4.4% informative	
<b>Halide content:</b>	Zero	
<b>Acid value:</b>	37 ± 3 mg KOH/g	
<b>Specific density at 20°C (77°F):</b>	1.012 ± 0.002 g/cm <sup>3</sup>	
<b>Recommended thinner:</b>	no thinner required	
<b>J-STD-004:</b>	OR M0	
<b>DIN EN 29454-1:</b>	2.1.3.A	

(1) Some yellowing of the flux may occur during storage or prolonged exposure to light. This does not affect performance

**Surface Insulation Resistance:** Stannol WF300F/S liquid fluxes PASS the J STD 004 surface insulation resistance test without cleaning.

## **SHELF LIFE**

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1 year after date of delivery (provided proper storage in originally sealed container).

## **HEALTH AND SAFETY**

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Before using please read the material safety data sheet carefully and observe the safety precautions described.

## **NOTICE**

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The above values are typical and represent no form of specification. The Data Sheet serves for information purposes. Any verbal or written advise is not binding for the company, whether such information originates from the company offices or from a sales representative. This is also in respect of any protection rights of third parties, and does not release the customer from the responsibility of verifying the products of the company for suitability of use for the intended process or purpose. Should any liability on the part of the company arise, the company will only indemnify for loss or damage to the same extent as for defects in quality.