



Technical Data Sheet

STANNOL® liquid flux X33-09

low residue, high activity flux

- Liquid flux for copper substrate
- Exploits No Clean Technology
- Wave, spray or foam application

Description

STANNOL® X33-09 is a low residue, resin and halide free liquid flux especially suitable for resin coated copper surfaces.

Applications

Recommended for consumer electronics, telecommunications and professional applications, particularly those using organic solderability preservative-finished PCBs. Conventional or nitrogeninerted wave soldering processes are suitable.

Recommended Operating Conditions

The Printed Circuit Board: STANNOL® X33-09 has been formulated to work over a wide range of solder resists and is tolerant of poorly adherent finishes. The solvent system in STANNOL® X33-09 is designed for optimum wetting of surfaces and is not aggressive towards common plastics.

STANNOL® X33-09 is particularly effective on bare, passivated or lacquered (resin coated) copper circuit boards. It may also be used on tin/lead coated boards. Low residue fluxes generally produce poor through-hole filling, particularly on copper finishes. STANNOL® X33-09 has been especially formulated to overcome this problem.

Machine Preparation: When switching to STANNOL® X33-09 from any other flux, ensure all fingers, pallets and conveyors are thoroughly cleaned. It is recommended that STANNOL® Flux-Ex 200/B Cleaner be used in the finger cleaners.

STANNOL® X33-09 is compatible with machine construction materials and may be used in air or inerted processes. Build up of solvent condensate in fully enclosed inert machines has been avoided by careful choice of the solvent system.

Fluxing: STANNOL® X33-09 has been formulated for use in wave, spray or foam fluxers in the same way as ordinary fluxes on standard wave soldering machines. The upper limit for flux coverage to ensure that soldered PCBs pass cleanliness tests is 25g m⁻² of circuit. Good soldering can be achieved at half this value. It is important to remove excess flux from the circuit boards using the standard air knife or brushes supplied on the wave soldering machine. An air pressure of about 5 - 7psi is recommended and the nozzle should be about 2.5cm below the board and angled back at a few degrees to the perpendicular to the plane of the board. This will ensure effective removal of excess flux without transferring droplets to the top of the following board. During foam application, space should be allowed between the fluxer and the air knife to prevent the air stream disturbing the foam. Observing the following instructions will further benefit foaming and soldering results.

1. Use DRY AIR.
2. Keep the flux tank FULL at all times.
3. The top of the foaming stone should be no more than 2cm below the surface of the liquid flux. A fine foaming stone is preferred and if necessary, raise the level of the stone.
4. The preferred width of the slot (opening) of the foam fluxer is 10mm. If it is wider, add a strip of stainless steel or PVC across it to narrow the opening to 10mm. It is preferable to have a chimney for the foam which tapers towards the top.
5. DO NOT use hot fixtures or pallets as these cause the foam to deteriorate and increase losses by evaporation.
6. DO NOT use fixtures that have the potential to entrap flux.

Flux Control: Control of the flux concentration can be achieved in the conventional manner by measuring temperature and specific gravity. A nomograph is available to relate these measurements to the corrective action needed. It is essential that only STANNOL® VD-E 3370 thinner is used for thinning the flux. However, as the specific gravities of the flux and thinners are similar and will vary with water content, flux concentration control by measurement of acid value is more convenient and accurate. The STANNOL® Mini-Titration-Kit for use at the production line is recommended for this purpose.

Preheating: As X33-09 contains more solvent than conventional rosin fluxes, it will be necessary to adjust the preheater setting to remove the additional solvent and to ensure that the flux is properly activated. The optimum preheat temperature and time for a PCB depends on its design and the thermal mass of the components but the cycle should be sufficient to ensure that the flux coating is not visibly wet when it contacts the wave. A combination which has given good results is shown below.

Conveyor Speed	m min ⁻¹	1.5
Topside Preheat	°C	120

It is advantageous to fit a topside canopy over the preheaters to produce more effective drying and activation. This will allow the use of faster conveyor speeds and improve soldering. At a speed of 1.5m min⁻¹, a contact length of 38 - 50mm between the wave and the PCB is recommended. At lower speeds, this contact length should be reduced. Very slow speeds through the solder wave may produce dull solder joints.

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It is particularly useful when setting up a machine to measure the preheat using the **STANNOL® Thermologger 5000**.
IT IS IMPORTANT that flux solvent be removed by the preheat and that the PCB IS NOT VISIBLY WET when it reaches the solder wave.

Solders: **STANNOL® X33-09** flux can be used with all standard solder alloys. The recommended maximum solder bath temperature is 260°C (500°F). The solder bath temperature can generally be reduced compared with processes using conventional fluxes. Temperatures as low as 235° (455°F) may be used in some situations and this results in improved soldering and less wastage through drossing. Dwell time on the wave should be 1.5 - 2.5 seconds. Conveyor speed for dual wave systems should be at least 1.2m min⁻¹.

Cleaning: **STANNOL® X33-09** flux properly applied and processed leaves no discernible residues without cleaning. It is recommended that the soldering system itself be tested for cleanliness using an unfluxed board passed over the soldering machine. Suppliers should be requested to supply clean components and clean boards. Special applications may have regulations insisting on board cleaning and in such cases **STANNOL® Flux-Ex 200/B** may be used. These are free from ozone depleting chemicals and may also be used to remove any small accumulation of flux solids that might develop on parts of the soldering machine after prolonged use. Machine contamination will in any case be much less than with conventional rosin fluxes. Unlike water soluble fluxes, **STANNOL® X33-09** flux is not corrosive towards PCB handling equipment.

Physical Data and Properties and Data

General Properties	X33-09
Bellcore TR-NWT-000078, Issue 3	fully compliant
EN 29454 classification	2.2.3
Colour	colourless
Smell	alcoholic
Solids content	2.2% ± 0.3 w/w
Halide content	Zero
Acid value (on liquid) mg KOH/g	20 ± 1
Specific gravity at 25°C (77°F)	0.810 ± 0.002
Flash point (Abel)	12°C (53°F)

Special Properties:

Surface Insulation Resistance: **STANNOL® X33-09** flux gave the PASS results shown in the following table during surface insulation resistance tests.

Specification	Surface Insulation Resistance Measurements on uncleaned Combs					Typical SIR (ohms)
	Ageing Conditions					
	Temp (°C)	Humidity (%)	Time (h)	Voltage (V)	Test-Voltage (V)	
Bellcore TR-NWT-000078 Issue 3	35	85	96	50	100	2.8 x 10 ¹²
J-STD-004	85	85	168	50	100	1.4 x 10 ¹⁰

Electromigration: **STANNOL® X33-09** liquid flux gave the PASS results shown in the following table during electromigration testing to Bellcore TR-NWT-000078: 500h at 10V bias, 85°C and 85% RH.

Test condition	Initial SIR, ohms	Aged SIR, ohms
Control	2.2 x 10 ¹⁰	4.5 x 10 ¹⁰
Preheated, unsoldered	1.6 x 10 ¹⁰	3.1 x 10 ¹⁰
Soldered, uncleaned	1.4 x 10 ¹⁰	2.5 x 10 ¹⁰

Corrosion: **STANNOL® X33-09** passes the copper mirror test described in IPC-TM- 650, test method 2.3.32.

Thinner: **STANNOL® VD-E 3370**

Shelf life

2 years after date of delivery (provided proper storage in originally sealed container).

Health and Safety

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

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