



LIQUID FLUX X33F-07i, X33S-07i

Low residue no clean fluxes

DESCRIPTION

Stannol X33F-07i and X33S-07i are low residue, resin and halide free fluxes particularly for use on copper finishes from the pioneers of 'no clean' technology.

CHARACTERISTICS

This product offers the following advantages:

- **No visible residues - eliminates cleaning**
- **IPC classification L3CN**
- **Promotes through hole filling on bare, passivated and lacquered copper finishes**
- **Meet Bellcore TR-NWT-000078 Issue 3**
- **Formulations for wave, spray and foaming application**

APPLICATION

Recommended for consumer electronics, telecommunications and for professional applications using conventional wave soldering machines or nitrogen inerted units.

RECOMMENDED OPERATING CONDITIONS

The Printed Circuit Board: Stannol X33F-07i and X33S-07i have been formulated to work over a wide range of solder resists and are tolerant of poorly adherent finishes. The solvent system in Stannol X33F-07i and X33S-07i is designed for optimum wetting of surfaces and is not aggressive towards common plastics. Stannol X33F-07i and X33S-07i are particularly effective on bare, passivated or lacquered (resin coated) copper circuit boards. They may also be used on tin/lead coated boards. Low residue fluxes generally produce poor through-hole filling, particularly on copper finishes. Stannol X33F-07i and X33S-07i have been especially formulated to overcome this problem.

Machine: When switching to X33F/S-07i from any other flux, ensure all fingers, pallets and conveyors are thoroughly cleaned. It is recommended that Stannol Flux-Ex 200/B Solvent Cleaner be used in the finger cleaners. Stannol X33F/S-07i are 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 X33S-07i has been formulated for use in spray or wave fluxers in the same way as ordinary fluxes on standard wave soldering machines. Stannol X33F-07i has been formulated for use in foaming fluxers. The upper limit for flux coverage to ensure that soldered PCBs pass cleanliness tests is 25g.m2 of circuit. Good soldering can be achieved at half this volume. 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. Sufficient space should be allowed between the foam fluxer and the air knife to prevent the air stream disturbing the foam. Observing the following instructions will help ensure optimum 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 is achieved in the normal manner by measuring the temperature and specific gravity of the flux. A nomograph is available to show how these measurements are related to the corrective action needed. The specific gravities of the flux and thinners are similar and they vary with their water contents. As a result, flux concentration control by measurement of the acid value is more convenient. The Stannol Mini-Titration-Kit for use at the production line is available.

Preheating: As Stannol X33F-07i and X33S-07i contain 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. Combinations which have given good results are shown below:

Conveyor Speed:	m min ⁻¹	0.91	1.22	1.52	1.83
Topside Preheat	°C	80-100	70-110	70-100	70-100

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 5ft/min, a contact length of 1½-2" 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. 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 X33F/S-07i fluxes 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°C (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 of least 4ft/min.

Cleaning: Stannol X33F/S-07i fluxes properly applied and processed leave 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 X33F/S-07i fluxes are not corrosive towards PCB handling equipment.

PHYSICAL PROPERTIES AND DATA

GENERAL PROPERTIES	X33F-07i	X33S-07i
IPC classification:	L3CN	
Colour:	colourless	
Smell:	alcoholic	
Solids content:	2.7% ± 0.3 w/w	
Halide content:	Zero	
Acid value (on liquid) mg KOH/g:	19.5 ± 0.5	
Specific gravity at 25°C (77°F):	0.792 ± 0.002	
Flash point (Abel):	12°C (53°F)	
DIN EN 29454:	2.2.3	

Special Properties: Boards soldered with Stannol X33F/S-07i fluxes pass MIL-P-28809A ionic contamination test without cleaning provided excess flux is not applied and a clean system and components are used.

Corrosion: Stannol X33F/S-07i fluxes pass the following corrosion tests: USA Copper Mirror Test per MIL-F-14256D / UK Ministry of Defence DTD 599A / USA Bellcore TR-NWT-000078 IPC-SF-818 Flux Class 3 / BS 5625 Flux Class 4

Surface Insulation Resistance: Stannol X33F/S-07i fluxes gave the PASS results shown in the following table during surface insulation resistance tests.

Surface Insulation Resistance Measurements on uncleaned Combs						
Specification	Ageing Conditions					Typical SIR (ohms)
	Temp (°C)	Humidity (%)	Time (h)	Voltage (V)	Test-Voltage (V)	
Bellcore TR-NWT-000078 Issue 3	35	85	96	50	100	X33F-07i
						1,6 x 10 ¹¹
						X33S-07i
						5,2 x 10 ¹¹
IPC-SC-818 Class 3	85	85	168	50	100	X33F-07i
						9,6 x 10 ⁹
						X33S-07i
						2,2 x 10 ⁹

Electromigration: Stannol X33F/S-07i PASS the electromigration test requirements of TR-NWT-000078 at 10V bias for 500hr at 85°C and 85% RH.

Through-Hole Solder Penetration: Resin coated copper boards soldered in air.

FLUX	% PTH FILL	
	AS RECEIVED	OXIDISED BOARDS
Control	98.4	95.6
Preheated, unsoldered	93.6	48.6
Soldered, uncleaned	46.0	36.0

Thinner: Stannol VD-500

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.

NOTICE

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.