STANNOL® X33F-07I AND X33S-07I
LOW RESIDUE NO CLEAN FLUXES

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.

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

APPLICATIONS
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-07I and X33S-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-07I and X33S-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® X33F-07I has been formulated for use in spray or wave fluxers in the same way as ordinary fluxes on standard wave soldering machines. STANNOL® X33S-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.

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 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.

When it reaches the solder wave.

Dwell time on the wave should be 1.5-2.5 seconds. Conveyor speed for dual wave systems should be of least 4ft/min.

To complete your no-clean assembly, use the compatible STANNOL® Cored Solder Wire. Soldering iron tips should be kept clean with STANNOL® Tippy (data sheet available).

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Cleaning: STANNOL® X33F-07i and X33S-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-07i and X33S-07i fluxes are not corrosive towards PCB handling equipment.

TECHNICAL SPECIFICATION

The following table contains typical product data. A full description of test methods and detailed test results are available on request.

<table>
<thead>
<tr>
<th>General Properties</th>
<th>X33F-07i</th>
<th>X33S-07i</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPC classification</td>
<td>L3CN</td>
<td></td>
</tr>
<tr>
<td>Colour</td>
<td>Colourless</td>
<td></td>
</tr>
<tr>
<td>Smell</td>
<td>Alcoholic</td>
<td></td>
</tr>
<tr>
<td>Solids content</td>
<td>2.7% ± 0.3 w/w</td>
<td></td>
</tr>
<tr>
<td>Halide content</td>
<td>Zero</td>
<td></td>
</tr>
<tr>
<td>Acid value (on liquid) mg KOH/g</td>
<td>19.5 ± 0.5</td>
<td></td>
</tr>
<tr>
<td>Specific gravity at 25°C (77°F)</td>
<td>0.792 ± 0.002</td>
<td></td>
</tr>
<tr>
<td>Flash point (Abel)</td>
<td>12°C (53°F)</td>
<td></td>
</tr>
<tr>
<td>Thinters</td>
<td>VD 500</td>
<td></td>
</tr>
</tbody>
</table>

DIN EN 29454 2.2.3

SPECIAL PROPERTIES

Boards soldered with STANNOL® X33F-07i and X33S-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. STANNOL® X33F-07i and X33S-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
- BS5625 Flux Class 4

Surface Insulation Resistance

STANNOL® X33F-07i and X33S-07i liquid fluxes gave the PASS results shown in the following table during surface insulation resistance tests.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Ageing Conditions</th>
<th>Temp. °C</th>
<th>Relative Humidity %</th>
<th>Time hr</th>
<th>Voltage V</th>
<th>Test Voltage V</th>
<th>Typical SIR ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bellcore TR-NWT-000078</td>
<td>Issue 3</td>
<td>35</td>
<td>85</td>
<td>96</td>
<td>50</td>
<td>100</td>
<td>X33F-07i 1.6 x 1011</td>
</tr>
<tr>
<td>IPC-SF-818</td>
<td>Class 3</td>
<td>85</td>
<td>85</td>
<td>168</td>
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<td>USA Copper Mirror Test per MIL-F-14256D</td>
<td>Issue 3</td>
<td>85</td>
<td>85</td>
<td>168</td>
<td>50</td>
<td>100</td>
<td>X33S-07i 2.2 x 109</td>
</tr>
</tbody>
</table>

Electromigration

STANNOL® X33F-07i and X33S-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.

<table>
<thead>
<tr>
<th>Flux</th>
<th>% Pth fill</th>
</tr>
</thead>
<tbody>
<tr>
<td>X33S-07i</td>
<td>98.4</td>
</tr>
<tr>
<td>Low resin LSF</td>
<td>93.6</td>
</tr>
<tr>
<td>Resin-free LSF</td>
<td>46.0</td>
</tr>
</tbody>
</table>

HEALTH AND SAFETY

WARNING: The following information is for guidance only and users must refer to the Material Safety Data Sheets relevant to STANNOL® X33F-07i and X33S-07i Low Residue Fluxes before use.

Fumes/Vapours and Precautions: Excessive inhalation of the solvent vapour, which may cause headaches, dizziness and nausea and the flux fumes given off at soldering temperature, which are irritating to the throat and respiratory organs, should be avoided. The TLV of the solvent is 400ppm. STANNOL® X33F-07i and X33S-07i liquid fluxes must always be used in well ventilated areas. Suitable fume extraction equipment should be used to extract solvent vapours and flux fumes away from the operators.

Protection and Hygiene: Suitable protective clothing should be worn to prevent the materials from coming into contact with the skin and eyes. If the materials come into contact with the skin, the affected area should be washed with soap and water. If the materials come into contact with the eyes, they should be irrigated thoroughly with running water for at least 10 minutes and medical attention sought. Eating and drinking should not be permitted in the working area and hands should be washed thoroughly with soap and warm water before eating.

Fire Hazards and Precautions: STANNOL® X33F-07i and X33S-07i liquid fluxes contain a highly flammable solvent with a flashpoint of 12°C (53°F). These materials must not be used near naked flames or non-flameproof electrical equipment. Smoking must not be permitted in the working area. Carbon dioxide, alcohol resistant foam or dry powder extinguishers should be used if the materials catch fire.

Spillage and Waste Disposal: Spillage of the materials should be mopped up with sand or sawdust. Waste materials should be stored in closed containers and disposed of in accordance with local regulations.

The above values are typical and represent no form of specification. The Data Sheet serves merely 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.

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