



# NO RESIDUE FLUX

## HALIDE FREE X32-10i

Multicore X32-10i is a no residue halide free flux with a wider operating window from the pioneers of 'no clean' technology.

- Fast soldering on conventional leaded and SMD components - no bridges or icicles
- No cleaning - reduces costs and eliminates CFC usage
- Wide operating window
- Non corrosive - safer than RMA fluxes
- High surface insulation resistance - without cleaning
- No residues to interfere with ATE probes – without cleaning

### APPLICATIONS

Recommended for consumer electronics and telecommunications use and for professional applications with conformal coatings. Different solvent carrier blends may be available to meet local conditions and will be specified by a different suffix (e.g. X32-10m).

### RECOMMENDED OPERATION CONDITIONS

**The Printed Circuit Board:** Multicore X32-10i is recommended for use on clean copper or tin-lead coated PCBs. Specifying the use of a copper circuit preservative will ensure better soldering and excellent post-soldering cleanliness. Multicore X32-10i will solder satisfactorily over most rosin-based surface preservatives but the rosin residues from the preservative will reduce board cleanliness unless cleaning is employed. It is recommended that the rosin based preservative be applied no longer than 3 months before soldering with X32-10i.

Multicore X32-10i has been formulated to work over a wide range of solder resists. The solvent system in Multicore X32-10i is designed for optimum wetting of surfaces but prolonged contact with polystyrene, polyvinyl chloride or polycarbonate is not recommended.

**Machine Preparation:** When switching to X32-10i from any other flux, ensure all fingers, pallets and conveyors are thoroughly cleaned. It may be necessary to steam clean the equipment to remove all residues.

It is recommended that Multicore PC83 Solvent Cleaner be used in the finger cleaners.

**Fluxing:** Multicore X32-10i has been formulated for use in foam, spray or wavefluxers 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  $25\text{g/m}^2$  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 25mm 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 20mm below the surface of the liquid flux. A fine foaming stone is preferred and if necessary, the level of the stone should be raised.
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 which 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 gravity of the flux and thinners is similar and varies with water content. As a result, flux concentration control by measurement of the acid value is more convenient. The Multicore SCK001 test kit for use at the production line is available.

**Preheating:** As X32-10i contains more solvent than conventional fluxes, it will be necessary to increase the preheat settings 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.

The combination of very low resin content and special solvent blend produce a wider operating window compared with other low solids content liquid fluxes. Conditions will vary from one machine to another but the following settings give good results on a number of systems:

CONVEYOR	Ft/min	4	5	6
SPEED	m/min	1.22	1.52	1.83
TOPSIDE PREHEAT	°C	82-83	93-99	99-104
	°F	180-183	200-208	210-218

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, 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.

It is particularly useful when setting up a machine to measure the preheat using the MulticoreSoldaPro Temperature Profiling System (data sheet available).

IT IS IMPORTANT that flux solvent be removed by the preheat and that the PCB IS NOT WET when it reaches the solder wave.

**Solders:** Multicore X32-10i 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°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 at least 1.2m/min.

To complete the no clean assembly process, compatible Multicore cored solder wire and solder cream are available. Soldering iron tips should be kept clean with Multicore Tip Tinner/Cleaner TTC1 (data sheet available).

**Cleaning:** Multicore X32-10i 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 with good solderability. Special applications may have regulations insisting on board cleaning and in such cases MulticoreProzone or PC83 Solvent Cleaner should be used. These are economic cleaners which are free from CFC compounds and may 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, Multicore X32-10i flux is not corrosive towards PCB-handling equipment.

## TECHNICAL SPECIFICATION

A full description of test methods and detailed test results are available on request.

General Properties	X32-10i
Colour	Colourless
Smell	Alcoholic
Solids content	2.5 ± 0.5% w/w
Halide content	Zero
Acid value (on liquid) mg KOH/g	16 ± 0.5
Specific gravity at 25°C (77°F)	0.812 ± 0.002
Flash point (Abel)	12°C (53°F)
Thinners	X732-10i
ISO 9454 classification	1.2.3
ANSI JSTD 004 classification	P
IPC classification	M3CN
EN 29454 classification	1.2.3

## SPECIAL PROPERTIES

**Boards soldered with Multicore X32-10i flux pass MIL-P-28809A ionic contamination test without cleaning provided excess flux is not applied and a clean system and components are used.**

**Multicore X32-10i flux passes the following corrosion tests:**

**USA Copper Mirror Test per MIL-F-14256D**

**UK Ministry of Defence DTD 599A**

**USA Bellcore TR-TSY-000078**

## Surface Insulation Resistance

Multicore X32-10i liquid flux gave the PASS results shown in the following table during surface insulation resistance tests.

Surface Insulation Resistance Measurements on Uncleaned Combs						
Specification	Ageing Conditions				Test Voltage V	Typical SIR ohms
	Temp °C	Relative Humidity %	Time hr	Voltage V		
Bellcore TR-TSY-000078	35	90	96	50	100	6.5 x 1010
Bellcore TA-NWT-000078	35	85	96	50	100	3.4 x 1011
JIS-Z-3197	40	90	96	None	500	5.2 x 1010

## Conformal Coatings

Extended surface insulation resistance tests using conformally coated IPC-B-25 type B test combs were carried out at 85°C and 85% RH and a test voltage of 100V DC. The following table shows that conformal coatings perform well over uncleaned X32-10i residues compared with the same coatings over cleaned, unfluxed boards.

Flux Type	Conformal Coating Type	Surface insulation resistance (ohms) after 168 hours
None X32-10i	Acrylic	1.75 x 10 <sup>9</sup>
		1.20 x 10 <sup>9</sup>
None X32-10i	Modified Silicone	2.13 x 10 <sup>9</sup>
		1.19 x 10 <sup>9</sup>

## HEALTH AND SAFETY

**WARNING:** The following information is for guidance only and users must refer to the Material Safety Data Sheet relevant to Multicore X32-10i 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. Multicore X32-10i liquid flux 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 material from coming into contact with the skin and eyes. If the material comes into contact with the skin, the affected area should be washed with soap and water. If the material comes 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:** Multicore X32-10i liquid flux contains a highly flammable solvent with a flashpoint of 12°C (53°F). The material 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 material catches fire.

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



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MULTICORE SOLDERS

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