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Laboratory Data Sheet

Product X32-10m

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PRODUCT DESCRIPTION

LOCTITE® Product Multicore™ X32-10m is a no residue, halide free flux with a wide operating window.

- Fast soldering on conventional leaded and SMD components - no bridges or icicles
- No cleaning - reduces costs and eliminates chemical 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

TYPICAL APPLICATIONS

Recommended for consumer electronics and telecommunications use and for 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. X32-10i).

TYPICAL PROPERTIES

The following table contains typical product data. Test results are available on request.

General Properties	X32-10m
Color	Colorless
Smell	Alcoholic
Solids content	2.2 ± 0.4% w/w
Halide content	Zero
Acid value (on liquid) mg KOH/g	15.3 ± 0.5
Specific gravity at 25°C (77°F)	0.817 ± 0.002
Flash point (Abel)	11-12°C (53°F)
Autoignition Point	>455°C (850°F)
Thinners	T70
ISO 9454 classification	1.2.3
ANSI JSTD 004 classification	REM0
IPC classification (SF 818)	M3CN
EN 29454 classification	1.2.3

TYPICAL RELIABILITY PROPERTIES

Boards soldered with Multicore X32-10m 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 X32-10m flux passes the following corrosion tests:

USA Copper Mirror Test per MIL-F-14256D

UK Ministry of Defense DTD 599A

USA Bellcore TR-TSY-000078

Surface Insulation Resistance

Multicore X32-10m 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 10 ¹⁰
Bellcore TA-NWT-000078	35	85	96	50	100	3.4 x 10 ¹¹
IPC-SF-818	85	85	168	50	100	3.11 x 10 ⁹
JIS-Z-3197	40	90	96	None	500	5.2 x 10 ¹⁰

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 X32-10m residues compared with the same coatings over cleaned, unfluxed boards.

Flux Type	Conformal Coating Type	Surface insulation resistance (ohms) after 168 hours
None X32-10m	Acrylic	1.75 x 10 ⁹
		1.04 x 10 ⁹
None X32-10m	Modified Silicone	2.13 x 10 ⁹
		1.29 x 10 ⁹

NB it is still recommended that users still test compatibility with other conformal coatings.

GENERAL INFORMATION

For safe handling information on this product, consult the Material Safety Data Sheet, (MSDS).

Directions for Use

The Printed Circuit Board: Multicore X32-10m 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 X32-10m 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 X32-10m.

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

Fluxing: Multicore X32-10m has been formulated for use in foam, spray or wave 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/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 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 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 (possibly causing insufficient flux deposition) 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 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.

Preheating: As X32-10m contains more solvent than many fluxes, it may therefore 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 the 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 board temperatures gave good results on a number of systems:

CONVEYOR	Ft/min	4	5	6
SPEED	m/min	1.22	1.52	1.83
TOPSIDE	°C	79-90	90-99	96-104
PREHEAT	°F	175-195	195-210	205-220

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

Solder Alloys: Multicore X32-10m 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 crossing. 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 solder pastes are available. Soldering iron tips should be kept clean with Multicore Tip Tinner/Cleaner TTC1.

Cleaning: Multicore X32-10m flux properly applied and processed leaves no discernible residues. We recommend that the soldering system itself be tested for cleanliness using an unfluxed board passed over the soldering machine.

Special applications may have regulations insisting on board cleaning and in such cases, Multicore Prozone Cleaner should be used. This cleaner 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 X32-10m flux is not corrosive toward PCB-handling equipment.

Packaging: X32-10m is available in one gallon, five gallon, and 55 gallon containers.

Shelf Life: The shelf life of X32-10m is 2 years when stored as recommended in the original container.

Storage: Product shall be ideally stored in a cool, dry location away from direct sunlight in unopened containers at a temperature between 10° and 30°C (54° to 86°F) unless otherwise labeled. Optimal storage is 20° and 25°C (68° to 77°F). To prevent contamination of unused product, do not return any material to its original container.

X32-10m is classified as **FLAMMABLE** (as determined by OSHA) and must be stored in compliance with relevant regulations.

Data Ranges

The data contained herein may be reported as a typical value and/or range. Values are based on actual test data and are verified on a periodic basis.

Note

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Loctite Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Loctite Corporation's products. Loctite Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Loctite Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.