Technical Data Sheet

X33-12i Liquid Flux

January 2005

NO CLEAN, RESIN-FREE, HALIDE-FREE, SUSTAIINED ACTIVITY FLUX

Multicore X33-12i is a no clean, resin free, halide free liquid flux for surfaces with poor solderability.

- **Maximum process window and sustained activity – without resin**
- **High speed soldering on conventional leaded and SMD components – no bridges or icicles**
- **Good through hole penetration**
- **No cleaning – reduces costs**
- **Minimal residues to interfere with ATE probes without cleaning**
- **Compatible with rosin and OSP based surface preservatives**
- **Foam, spray or wave application**

APPLICATIONS

Recommended for consumer electronics and general electrical soldering applications, particularly where high throughput is desirable.
This is a robust product. Its process window is greater than that of the recently launched X1248 and it should be favoured when there is additional demand for high performance/reliability.

RECOMMENDED OPERATING CONDITIONS

The Printed Circuit Board: Multicore X33-12i is recommended for use on clean copper or tin-lead coated PCBs. It will solder satisfactorily over most surface preservatives. It is recommended that these are applied no longer than 3 months before soldering, since the period of protection is limited dependent on storage conditions.

Multicore X33-12i has been formulated to work over a wide range of solder resists. The solvent system in Multicore X33-12i has been designed for optimum wetting of surfaces but prolonged contact with polystyrene, PVC or polycarbonate is not recommended.

Machine Preparation: When switching to X33-12i from any other flux, ensure all fingers, pallets and conveyors are thoroughly cleaned. It is recommended that Multicore MCF800 Cleaner be used in the finger cleaners.

Fluxing: Multicore X33-12i has been formulated for use in foam, spray or wave fluxers in the same way as ordinary fluxes on standard wave soldering machines.

Observing the following instructions will help ensure optimum foaming:

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 and problems are encountered, 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 and increase losses by evaporation.
6. **DO NOT** use fixtures that have the potential to entrap flux.

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 5-7 psi is recommended and the nozzle should be about 25 mm below the board and angled back at a few degrees from 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.

Preheating: 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.

Conditions will vary from one machine to another but the following settings were found to give good results on a number of systems.

CONVEYOR SPEED	ft min $^{-1}$	3	4	5
	m min $^{-1}$	0.91	1.22	1.52
TOPSIDE PREHEAT	°C	80-85	85-90	95-100
	°F	176-185	185-194	203-212

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.

It is recommended to use a temperature profiling system to measure preheat and peak temperatures during set up of the wave soldering machine and for consistent process monitoring.

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 X33-12i flux can be used with all 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^{-1}.

To complete your no-clean assembly, use the compatible Multicore Cored Solder Wire and Solder Paste. Soldering iron tips should be kept clean with Multicore Tip Tinner/Cleaner TTC1 (data sheet available).

Cleaning: Special applications may have regulations insisting on board cleaning and in such cases Multicore MCF800 Cleaner should be used. This is an economic cleaner which is 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 X33-12i flux is not corrosive towards PCB handling equipment.

TECHNICAL SPECIFICATION

A full description of test methods and detailed test results are available on request. The results below are typical:

General Properties	X33-12i
Colour	Colourless
Smell	Alcoholic
Solids content	2.9%
Halide content	Zero
Acid value (on liquid) mg KOH/g	22.5
Specific gravity at 25°C (77°F)	0.810
Flashpoint (Abel)	12°C (53°F)
Thinners	PC70i
IPC-TM-650 Copper Mirror Test	Pass
J-STD-004 classification	ORM0
EN 29454 classification	2.2.3

SPECIAL PROPERTIES

Copper Mirror Test
Multicore X33-12i liquid flux passes the IPC-TM-650 2.3.32 Copper Mirror Test.

Surface Insulation Resistance
Multicore X33-12i liquid flux passes the J-STD-004 SIR test.

Electromigration Test
Multicore X33-12i liquid flux passes the Bellcore GR-78-CORE Electromigration test.

GENERAL INFORMATION

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

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, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel 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 Henkel 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.

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