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Technical Data Sheet

MFR301™ Liquid Flux

January 2008

PRODUCT DESCRIPTION

MFR301™ Liquid Flux provides the following product characteristics:

Technology	Liquid flux
Appearance	Pale rosin yellow
Odor	Alcoholic
Solids Content	5.5 - 6.5%
Cure	Not applicable
Application	Soldering

MFR301™ Liquid Flux is a no clean, high activity liquid flux for surfaces with poor solderability from the pioneers of “no clean” technology. Fast soldering on conventional leaded and SMD components – no bridges or icicles. Exceptional through-hole penetration. Sustained performance for maximum process window. No cleaning – reduces costs. Minimal residues to interfere with ATE probes without cleaning. Compatible with rosin based surface preservatives. Foam, spray or wave application. Typical applications for MFR301™ Liquid Flux is recommended for consumer electronics and general electrical soldering applications. The activator package is similar to that previously deployed in R32-07i™, but the acid value has been increased to further enhance efficacy, especially when soldering to poorly preserved substrates/components. A small amount of rosin is complemented by the solvent package to ensure optimum drainage characteristics at the exit of the wave, minimising bridges, spiking and mid-pad solder balling. This leaves a small amount of non-corrosive residue. This product can be applied by any of the usual techniques: foam, spray or wave.

DIRECTIONS FOR USE

The Printed Circuit Board:

MFR301™ Liquid Flux is recommended for use on copper or tin-lead coated PCBs. It will solder satisfactorily over most rosin-based preservatives. It is recommended that the rosin based preservative be applied no longer than 3 months before soldering, since the period of protection is limited dependent on storage conditions. MFR301™ Liquid Flux has been formulated to work over a wide range of solder resists.

Machine Preparation:

When switching to MFR301™ Liquid Flux from any other flux, ensure all fingers, pallets and conveyors are thoroughly cleaned. It is recommended that Multicore Prozone Solvent Cleaner is used in the finger cleaners.

Fluxing

MFR301™ Liquid Flux has been formulated for use in foam, spray or wave fluxers in the same way as ordinary fluxes on standard wave soldering machines. For foam fluxing 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 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 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 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 can be achieved in the conventional manner by measuring temperature and specific gravity. However, as the specific gravities of the flux and thinners are similar and will vary with water content, flux concentration control by measurement of acid value is more convenient and accurate. The Multicore SCK001 test kit for use at the production line is recommended for this purpose.

Preheating

The optimum preheat temperature and time for a PCB depend 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, m min^{-1}	0.91,	1.22,	1.52
Topside Preheat, °C	80 to 85,	85 to 90 ,	95 to 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 1.5m min-1, a contact length of 50-75mm 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 joint

It is particularly useful when setting up a machine to measure the preheat using the Multicore SoldaPro Temperature Profile 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

MFR301™ Liquid Flux flux can be used with all solder alloys. The recommended maximum solder bath temperature is 260°C . The solder bath temperature can generally be reduced compared with processes using conventional fluxes. Temperatures as low as 235°C may be used in some situations and this results in improved soldering and less wastage through drossing. Dwell time on the wave should be 0.5-1.0 seconds (chip wave) and 2.0-3.0 seconds (laminar wave). Conveyor speed for dual wave systems should be at least 1.2 m min-1. To complete your no-clean assembly, use the compatible Multicore Cored Solder Wire and Solder Cream. 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 Prozone may 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 soluable fluxes, this product is not corrosive towards PCB-handling equipment.

Surface Insulation Resistance

MFR301™ Liquid Flux passes the surface insulation resistance test requirements of J-STD-004 at 50V bias for 168h at 85°C and 85% RH.

Electromigration

MFR301™ Liquid Flux passes the electromigration test requirements of Bellcore GR-78-CORE at 10V bias for 500h at 65°C and 85% RH.

GENERAL INFORMATION

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

Not for Product Specifications

The technical information contained herein is intended for reference only. Please contact Henkel Technologies Technical Service for assistance and recommendations on specifications for this product.

Conversions

(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
µm / 25.4 = mil
N x 0.225 = lb
N/mm x 5.71 = lb/in
N/mm² x 145 = psi
MPa x 145 = psi
N·m x 8.851 = lb·in
N·m x 0.738 = lb·ft
N·mm x 0.142 = oz·in
mPa·s = cP

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