MULTICORE

TECHNICAL DATA SHEET
FEBRUARY 2023

MF 210

MF 210 is a low residue, resin and halide-free flux designed for surfaces with poor solderability. MF 210 is recommended for consumer electronics, and general electronics applications, particularly where high throughput is desirable. This is a robust product. Its wide process window makes it suitable for applications where there is additional demand for high performance/reliability. MF 210 can be applied by foam, spray or wave.

FEATURES AND BENEFITS

- High speed soldering on conventional leaded and SMD components without defects
- Good through hole penetration
- Highly effective on difficult to solder surfaces
- Sustained activity for maximum process window
- Minimal residues to interfere with ATE probes without cleaning
- Compatible with rosin and OSP surface preservatives
- Suitable for foam, wave and spray application
- Halide free

TYPICAL PROPERTIES

Property	Value
Acid Value (mgKOH/g)	22.5
Halide Content (%)	0
Solids Content (%)	2.9
Specific Gravity (@25°C)	0.810
Colour	Colourless
Thinner	PC70i

Reliability:

Test	Specification	Test Method	Results
Copper Mirror Corrosion	IPC/J-STD-004A	2.3.32D	Pass
Chlorides & Bromides	IPC/J-STD-004A	2.3.33	Pass
Surface Insulation Resistance (SIR) (without cleaning)	IPC/J-STD-004A	2.6.3.7	Pass
Electromigration (ECM) (without cleaning)	Telcordia GR-78-Core	13.1.4	Pass
Flux Activity Classification (without cleaning)	IPC/J-STD-004A ISO 9454		ORM0 2.2.3

RECOMMENDED OPERATING CONDITIONS

The Printed Circuit Board:
MF 210 is recommended for use on clean copper or solder plated 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. MF 210 has been formulated to work over a wide range of solder resists. The solvent system in MF 210 has been designed for optimum wetting of surfaces but prolonged contact with polystyrene, PVC or polycarbonate is not recommended.

Machine Preparation:
Ensure the soldering machine is thoroughly cleaned, including all fingers, pallets and conveyors, so that any possible contamination has been removed. MCF 800 Cleaner can be used in the finger cleaning system.

Fluxing:
MF 210 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.

Use **DRY AIR.**
Keep the flux tank **FULL** at all times. 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. The preferred width of the slot (opening) of the foam fluxer is 10mm. If it is wider and problems are encountered reduce the opening to 10mm. It is preferable to have a chimney for the foam which tapers towards the top.

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DO NOT use hot fixtures or pallets as these cause the foam to deteriorate and increase losses by evaporation.

DO NOT use fixtures that have the potential to entrap flux. This may lead to random solder balling caused by the sudden volatilisation of the trapped flux upon contact with the solder wave.
The upper limit for flux coverage to ensure that soldered PCBs pass cleanliness tests is 25g.m^{-2} of circuit. Good soldering can be achieved at half this volume. It is important to prevent deposition of excess flux and overspray on to the top side of the circuit.
It is strongly recommended that DRY air be used in the spraying process. Fitting a topside canopy over the preheater/s can help to produce more effective drying and activation. This will allow the use of faster conveyor speeds and improve soldering.

Preheating:
As MF 210 contains more solvent than conventional rosin fluxes, it will be necessary to adjust 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.
Combinations which have given good results are shown below.

Conveyor Speed	Topside Preheat Temperature	
	°C	°F
0.9m min^{-1} (3ft min^{-1})	80-85	176-185
1.2m min^{-1} (4ft min^{-1})	85-90	185-194
1.5m min^{-1} (5ft min^{-1})	90-100	194-212

Wave Soldering:
Excess moisture on the PCB during soldering may lead to random solder balling and poor wetting of some solder joints.
IT IS IMPORTANT that the flux solvent carrier is fully evaporated and that the PCB appears virtually dry when it reaches the solder wave.
At a speed of 1.5 m min^{-1} (5ft min^{-1}) a contact length of 38 to 50 mm between the solder 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.
MF 210 flux can be used with all standard solder alloys. The recommended maximum solder bath temperature is 250°C for leaded alloys. Temperatures as high as 275 to 280°C may be necessary for some lead-free alloys. Temperatures as low as 235°C in tin-lead soldering and 245°C in lead free may be used in some situations and this results in improved soldering and less wastage through dross formation. 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}.
IT IS IMPORTANT that flux solvent be removed by the preheat and that the **PCB IS NOT WET** when it reaches the solder wave.

Cleaning:
MF 210 is designed as a no-clean flux, however some applications may require board cleaning for which MCF 800 cleaner may be used. Boards soldered with MF 210 flux pass MIL-P-28809A ionic contamination test without cleaning provided excess flux is not applied and a clean system and components are used. It is recommended that the soldering system itself be tested for cleanliness using an un-fluxed board passed over the soldering machine. Suppliers should be requested to supply clean components and clean boards.
For a completely no-clean process, use Harima no-clean cored solder wire and/or no clean solder paste. These products also generate low levels of VOC emissions due to their low flux content and heat stable resins. Soldering iron tips should be kept clean with TTC-LF Tip Tinner/Cleaner (data sheet available).

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 gravities of the flux and thinners are similar and they vary with water contents. As a result, flux concentration control by measurement of the acid value is more convenient.

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Storage:
It is recommended to store MF 210 in a dry environment at room temperature, away from sources of ignition.

Shelf Life:
Provided MF 210 is stored as recommended above a shelf life of 2 years can be expected.

GENERAL INFORMATION
For safe handling information on this product consult the relevant Safety Data Sheet (SDS)

Disclaimer
The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. HARIMA is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product. Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

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