Technical Data Sheet

LOCTITE® MF 210

June 2021

PRODUCT DESCRIPTION

LOCTITE® MF 210 provides the following product characteristics:

Technology	No-clean liquid flux
Application	Wave soldering

LOCTITE® MF 210 is a low residue, resin and halide-free flux designed for surfaces with poor solderability.

FEATURES AND BENEFITS

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

APPLICATIONS

LOCTITE® 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.

TECHNICAL SPECIFICATION

LOCTITE® MF 210 liquid flux is designed for application by foam, wave and spray fluxing.

TYPICAL PROPERTIES

Flux Properties

Solids Content, %	2.9
Halide Content, %	0
Acid Value, mg KOH/g	22.5
Specific Gravity @ 25°C	0.810
Color	Colorless
Thinners	PC70i

RELIABILITY PROPERTIES

Test	Specification	Results
Copper Mirror	J-STD-004	Pass
Chromate Paper	J-STD-004	Pass
Surface Insulation Resistance (SIR)	J-STD-004	Pass
Electromigration	Telcordia GR-78-Core	Pass
Flux Activity Classification	J-STD-004	ORM0
	EN29454	2.2.3

DIRECTIONS FOR USE

The Printed Circuit Board:

LOCTITE® MF 210 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. LOCTITE® MF 210 has been formulated to work over a wide range of solder resists. The solvent system in LOCTITE® 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 converyors, so that any possible contamination has been removed. LOCTITE® MCF 800 cleaner can be used in the finger cleaners.

Fluxing
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 recommended 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 reduce 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 will cause the foam to deteriorate and increase solvent loss by evaporation.
6. **DO NOT** use fixtures that can 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 to 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 from disturbing the foam.

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.

Preheating
As LOCTITE® 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 to 85 (176 to 185)
1.2m min^{-1} (4ft min^{-1})	85 to 90 (185 to 194)
1.5m min^{-1} (5ft min^{-1})	90 to 100 (194 to 212)

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.

Wave Soldering:

1. Excess moisture on the PCB during soldering may lead to random solder balling and poor wetting of some solder joints.
2. IT IS IMPORTANT that the flux solvent carrier is fully evaporated and that the PCB appears virtually dry when it reaches the solder wave.
3. 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.
4. 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.
5. LOCTITE® 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. The solder bath temperature can generally be reduced when 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 solder dross formation.
6. Dwell time on the wave should be 1.5 to 2.5 seconds.

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:
LOCTITE® MF 210 is designed as a no-clean flux, however some applications may require board cleaning for which LOCTITE® MCF 800 cleaner.

Boards soldered with LOCTITE® 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 unfluxed board passed over the soldering machine. Suppliers should be requested to supply clean components and clean boards.

For a completely no-clean process, use LOCTITE® 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 LOCTITE® TTC-LF Tip Tinner/Cleaner (data sheet available). .

STORAGE AND SHELF LIFE

Storage:

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

Shelf Life:

Provided LOCTITE® MF 210 is stored as recommended above a shelf life of 2 years can be expected.

DATA RANGES

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

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

Disclaimer

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Reference 2

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