Technical Data Sheet

LOCTITE® HYDX-20

August 2021

PRODUCT DESCRIPTION

LOCTITE® HYDX-20 provides the following product characteristics:

Technology	Water-wash liquid flux
Application	Wave soldering

LOCTITE® HYDX-20 is a water-soluble liquid flux designed for surfaces with poor solderability where water cleaning is acceptable.

FEATURES AND BENEFITS

- Readily water cleanable residues
- Clean boards readily meet MIL-P-28809A requirements
- No white residue after 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
- No penetration of properly cured solder resists

APPLICATIONS

LOCTITE® HYDX-20 is recommended for electronics applications where water cleaning is acceptable. Its wide process window makes it suitable for applications where there is additional demand for high performance/reliability.

TECHNICAL SPECIFICATION

LOCTITE® HYDX-20 liquid flux is designed for application by foam, wave and spray fluxing.

TYPICAL PROPERTIES

Flux Properties

Solids Content, %	20
Halide Content, Cl %	0.98
Acid Value, mgKOH/g	24
Specific Gravity @ 25°C	0.874
Colour	Green
Freeze-thaw stability @ -20ºC	No separation
Recommended thinner	PC70i

RELIABILITY PROPERTIES

Test	Specification	Results
Surface Insulation Resistance (SIR)	J-STD-004	Pass*
Flux Activity Classification	J-STD-004 EN29454	ORH1 2.1.2

*after cleaning

RECOMMENDED OPERATING CONDITIONS

The Printed Circuit Board:

LOCTITE® HYDX-20 is recommended for use on clean copper or tin-lead coated PCBs. LOCTITE® HYDX-20 has been formulated to work over a wide range of solder resists. It does not penetrate solder resists which have been properly cured. The solvent system in LOCTITE® HYDX-20 has been designed for optimum wetting of surfaces.

Machine Preparation:

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

Fluxing:

LOCTITE® HYDX-20 has been formulated for use in wave soldering applications and is particularly suitable for use with foam fluxers. The fine foam generated produces a uniform coating of flux on the circuit board. 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 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.

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 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.

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.

Preheating:
As LOCTITE® HYDX-20 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})	85 to 90 (185 to 194)
1.2m min^{-1} (4ft min^{-1})	90 to 100 (194 to 212)
1.5m min^{-1} (5ft min^{-1})	100 to 110 (212 to 230)

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 1.5m 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® HYDX-20 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:

It is essential that the residues of LOCTITE® HYDX-20 are removed as soon as possible after soldering. They are designed to be readily cleaned in warm water (minimum 50°C recommended) using either in-line or batch cleaning systems. The flux residues do not create excessive foam in the washing machine and present no special hazard during waste disposal. Properly processed and cleaned boards soldered with LOCTITE® HYDX-20 easily meet the ionic contamination requirements of MIL-P-28809A provided a clean system and components are used. It is recommended that samples from production are regularly checked to ensure that the cleaning process is operating effectively. For a completely water-washable process, use LOCTITE® HYDX cored solder wire and/or water-wash 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® HYDX-20 in a dry environment at room temperature, away from sources of ignition.

Shelf Life:

Provided LOCTITE® HYDX-20 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

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