



## 2220-VF Soldering Flux

### VOC-Free, Organic Water-Soluble Liquid Flux

#### Product Description

Kester 2220-VF is a high-activity, organic flux designed for lead-free automated wave solder applications. The flux will provide maximum capillary wetting action up plated through-holes, making it ideal for use on multilayer boards. Along with this enhanced activity, 2220-VF flux produces bright, shiny solder joints and the residue after soldering is effectively removed in standard water cleaning systems.

2220-VF is free of volatile organic compounds (VOCs), which provides optimal heat stability for the lead-free wave soldering process. The use of VOC-free solvents eliminates the use of ozone depleting chemicals which results in an environmentally friendly process.

#### Performance Characteristics:

- Thermally Stable and VOC-free to allow for effective high temperature soldering
- High activity
- Minimizes icicling and bridging
- Chemically compatible with most solder masks and board laminates
- High ionic cleanliness and no surface insulation resistance degradation
- Compatible with leaded and lead-free wave soldering applications
- Classified as ORH1 per J-STD-004

#### RoHS Compliance

This product meets the requirements of the Restriction of Hazardous Substances (RoHS) Directive. Additional RoHS information is located at <https://www.kester.com/downloads/environmental>.

#### Physical Properties

**Percent Solids (typical): 7%**  
Tested to J-STD-004, IPC-TM-650, Method 2.3.34

**Specific Gravity: 1.060**  
Anton Paar DMA 35 @ 25°C

**Thinner: DI Water**

#### Reliability Properties

**Copper Mirror Corrosion: High**  
Tested to J-STD-004, IPC-TM-650, Method 2.3.32

**Surface Insulation Resistivity (SIR), (typical): Pass**  
Tested to J-STD-004, IPC-TM-650, Method 2.6.3.3

**Fluorides by Spot Test: Pass**  
Tested to J-STD-004, IPC-TM-650, Method 2.3.35.1

**Corrosion Test: High**  
Tested to J-STD-004, IPC-TM-650, Method 2.6.15

|       | Blank                 | 2220-VF               |
|-------|-----------------------|-----------------------|
| Day 1 | 9.5*10 <sup>9</sup> Ω | 6.0*10 <sup>8</sup> Ω |
| Day 4 | 8.3*10 <sup>9</sup> Ω | 7.8*10 <sup>8</sup> Ω |
| Day 7 | 8.4*10 <sup>9</sup> Ω | 1.0*10 <sup>9</sup> Ω |

**Chloride and Bromides: 2.4%**  
Tested to J-STD-004, IPC-TM-650, Method 2.3.35

**Silver Chromate: Fail**  
Tested to J-STD-004, IPC-TM-650, Method 2.3.33

## Flux Application

2220-VF can be applied to circuit boards by a spray, dip, foam or wave process. An air knife after the flux tank is recommended to remove excess flux from the circuit board and prevent dripping on the preheater surface.

## Process Considerations

The optimum preheat temperature for most circuit assemblies is 104-116°C (220-240°F) as measured on the top or component side of the printed circuit board. Dwell time in the wave is typically 2-4 seconds. The wave soldering speed should be adjusted to accomplish proper preheating and evaporate excess solvent, which could cause splattering. For best results, speeds of 1.1-1.8 m/min (3½-6 ft/min) are used. The surface tension has been adjusted to help the flux form a thin film on the board surface allowing rapid solvent evaporation.

## Elimination of Splattering

Since VOC-free fluxes are water-based, splattering can be a problem. Splattering occurs when water comes in contact with molten solder, so it may be necessary to use forced air to drive off the water. Manufacturers have reported that blowing hot air at 0.28-0.85 m<sup>3</sup>/hr (10-30 ft<sup>3</sup>/hr) greatly assists in drying the water off the circuit boards.

## Flux Control

Specific gravity is normally the most reliable method to control the flux concentration. To check concentration, a hydrometer should be used. Control of the flux in the foam flux tank during use is necessary for assurance of consistent flux distribution on the circuit boards. DI water can be used to replace evaporative losses. When excessive debris from circuit boards, such as board fibers and from the air line build up in the flux tank, these particulates will redeposit on the circuit boards which may create a build up of residues on probe test pins. It is, therefore, necessary to clean the tank and then replenish it with fresh flux when excessive debris accumulates in the flux tank.

## Cleaning

No neutralizer, saponifiers or detergents are necessary in the water wash system for complete removal of flux residues. It is not recommended to use high mineral content tap water. Otherwise, tap, deionized or softened water may be used for cleaning. The optimum water temperature is 49-60°C (120-140°F), although lower temperatures may be sufficient.

## Storage, Handling and Shelf Life

Because this formulation is water-based, it is subject to freezing. A minimum storage temperature of 4°C (40°F) is recommended. If frozen, the 2220-VF is easily reconstituted by stirring at room temperature. Shelf life is 1 year from the date of manufacture when handled properly and held at 4-25°C (40-77°F).

## Health and Safety

This product, during handling or use, may be hazardous to your health or the environment. Read the Safety Data Sheet and warning label before using this product. Safety Data Sheets are available at <https://www.kester.com/downloads/sds>.