IJSR-4000 JM03G

(UL Name: IJSR-4000AA)

INKJET SOLDER MASK

- **Application by inkjet**
- **Available in a Green Finish**
- **Excellent adhesion to laminate and copper**
- **Dual Cure System**
- **Tack Free after printing**
- **RoHS Compliant**
- **Meets NASA Outgassing Requirements**
- **Compatible with Lead-Free Processing**
- **Excellent Printing Quality**
- **Fine Resolution Capabilities**
- **Withstands ENIG & Immersion Tin**
- **Low Odor**

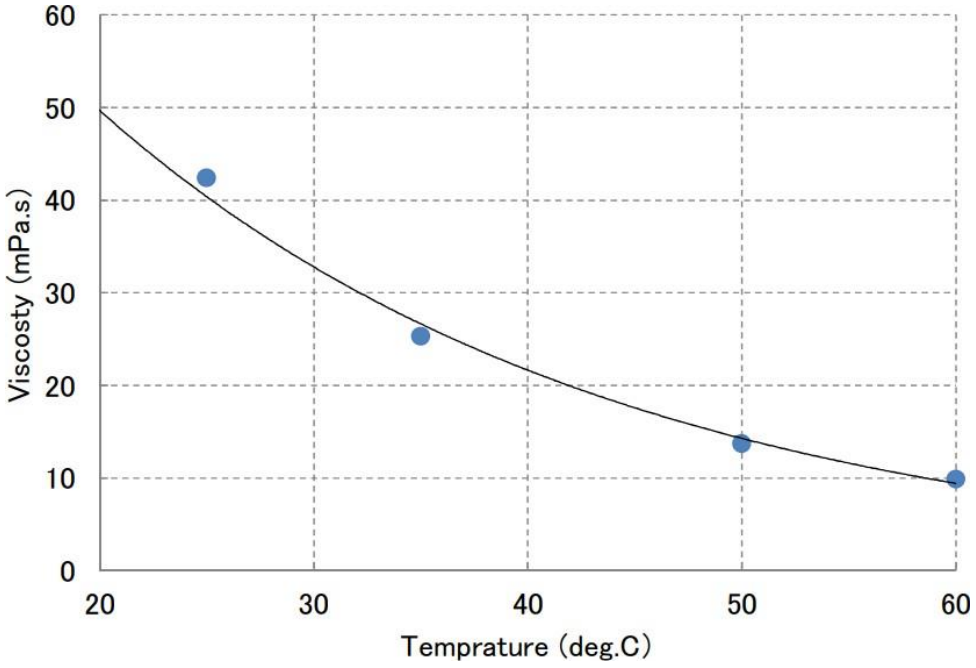
PROCESSING PARAMETERS FOR IJSR-4000 JM03G

IJSR-4000 JM03G is a single component solder mask product for inkjet application. The product is designed to be used on inkjet equipment. It has good adhesion to laminate and copper and good resistance to alternate metal finishes such as ENIG and Immersion Tin while maintaining fine features. All Taiyo America products comply with the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the Restriction of the use of certain Hazardous Substances (RoHS) in electrical and electronic equipment.

IJSR-4000 JM03G SPECIFICATIONS:

IJSR-4000 JM03G	
Color:	Green
Viscosity @ 25°C:	36.0 ± 5.0 mPa • s
Specific Gravity:	1.1 ± 0.1
Surface tension:	35.0 ± 2.0 mN/m
Particle size:	< 1um
Solvent:	None
Cleaning solution:	IJPR-1000 CL03

VISCOSITY CURE



PROCESSING PARAMETERS FOR IJSR-4000 JM03G

PRE-CLEANING

Prior to solder mask application, the printed circuit board surface needs to be cleaned. Various cleaning methods include Pumice, Aluminum Oxide, Mechanical Brush, and Chemical Clean. All these methods will provide a clean surface of the printed circuit board. For inkjet, we recommend a slightly rough surface to prevent bleeding of the solder mask. For micro etch, we recommend an etch of 1 um.

Prior to inkjetting, the **IJSR-4000 JM03G** onto the printed circuit board, a pre-treatment of the surface needs to be performed for optimal printing performance. Taiyo America recommends that the contact angle on the copper and laminate be more than 40°.

INKJET PRINTING

Method/Equipment: Piezo inkjet printer

- Inkjet viscosity during printing: 10 – 15 mPa • s
- On-head UV lamp (365nm LED): 800 - 1700 mJ/cm^2

THERMAL CURE

IJSR-4000 JM03G requires a thermal cure to insure optimal final property performance. Thermal curing can be done in a batch oven or conveyorized oven.

- Temperature: 300°F (149°C)
- Time at Temperature: 60 minutes

UV CURE (OPTIONAL)

A UV cure is recommended to increase surface hardness for **IJSR-4000 JM03G**.

- UV cure of 2 -3 J/cm^2 is recommended

For Process Optimization please contact your local Taiyo America Representative

FINAL PROPERTIES FOR IJSR-4000 JM03G

IPC-SM-840E, Class H & T, Solder Mask Vendor Testing Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Visual	3.3.1	Uniform in Appearance	Pass
Curing	3.2.5.1	Ref: 3.6.1.1, 3.7.1 and 3.7.2	Pass
Non-Nutrient	3.2.6	Does not contribute to biological growth	Pass
Pencil Hardness	3.5.1	Minimum "F"	Pass – 3H
Adhesion	3.5.2.1	Rigid – Cu, Ni, FR-4	Pass
Adhesion	3.5.2.6	Doubled Layered Solder Mask	Pass
Machinability	3.5.3	No Cracking or Tearing	Pass
Resistance to Solvents and Cleaning Agents	3.6.1.1	Table 3 Solvents	Pass
Hydrolytic Stability and Aging	3.6.2	No Change after 28 days of 95-99°C and 90-98% RH	Pass
Solderability	3.7.1	No Adverse Effect J-STD-003	Pass
Resistance to Solder	3.7.2	No Solder Sticking	Pass
Resistance to Solder	3.7.3	No Solder Sticking	Pass
Simulation of Lead Free Reflow	3.7.3.1	No Solder Sticking	Pass
Dielectric Strength	3.8.1	500 VDC / mil Minimum	Pass – 8200 V/mil
Thermal Shock	3.9.3	No Blistering, Crazing or De-lamination	Pass

Specific Class "H" Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Flammability	3.6.3.1	UL 94V-0	Pass – File #E166421
Insulation Resistance Before Soldering After Soldering	3.8.2	 5×10^8 ohms minimum 5×10^8 ohms minimum	 Pass (1.93×10^{11} ohms) Pass (2.76×10^{12} ohms)
Moisture & Insulation Resistance Before Soldering–In Chamber Before Soldering–Out of Chamber After Soldering-In Chamber After Soldering-Out of Chamber	3.9.1	 5×10^8 ohms minimum 5×10^8 ohms minimum 5×10^8 ohms minimum 5×10^8 ohms minimum	 Pass (7.38×10^{12} ohms) Pass (1.57×10^{12} ohms) Pass (3.79×10^{12} ohms) Pass (1.58×10^{13}ohms)
Electrochemical Migration	3.9.2	$>2.0 \times 10^6$ ohms, no dendritic growth	Pass (4.92×10^{12} ohms)

Specific Class "T" Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Flammability	3.6.3.2	Bellcore 0_2 Index – 28 minimum	Pass
Insulation Resistance Before Soldering After Soldering	3.8.2	 5×10^8 ohms minimum 5×10^8 ohms minimum	 Pass (8.83×10^{11} ohms) Pass (4.86×10^9 ohms)

FINAL PROPERTIES FOR IJSR-4000 JM03G

Specific Class "T" Requirements

TEST	SM-840 PARAGRAPH	REQUIREMENT	RESULT
Moisture & Insulation Resistance Before Soldering–In Chamber Before Soldering–Out of Chamber After Soldering-In Chamber After Soldering-Out of Chamber	3.9.1	 5×10^8 ohms minimum 5×10^8 ohms minimum 5×10^8 ohms minimum 5×10^8 ohms minimum	 Pass (6.70×10^{13} ohms) Pass (2.07×10^{12}ohms) Pass (1.78×10^{13}ohms) Pass (6.98×10^{12}ohms)
Electrochemical Migration	3.9.2	< 1 decade drop, no dendritic growth	Pass

Additional Tests / Results

TEST	REQUIREMENT	RESULT
Solder Heat Resistance	Solder float test: Rosin Flux 260°C/10 second x 3 cycles	Pass
Solvent Resistance	PGM-AC dipping, temp 20°C. / 20 min, Tape peeling test	Pass
Acid Resistance	10 vol% H_2SO_4, temp 20°C. / 20 min, Tape peeling test	Pass
Alkaline Resistance	10 wt% NaOH, temp 20°C. / 20 min, Tape peeling test	Pass
Electroless Ni/Au	TAIYO Internal Test Method Ni: 3 microns, Au: 0.03 microns	Pass
Outgassing	ASTM E595 %RML = %TML - WVR <1.0% %CVCM <0.10%	Pass %RML = 0.47% %CVCM = 0.10%