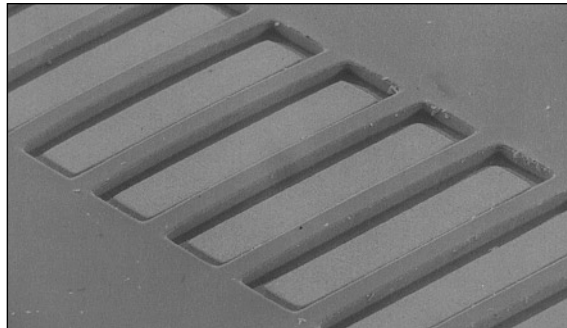


DYNAMASK® 5000 Series

Dry Film Solder Mask

Dynamask 5000 Series is the latest advance in dry film solder mask technology. Like all Dynamask dry film solder masks, Dynamask 5000 Series is aqueous processible and utilizes epoxy chemistry materials well known for their electrical insulation, chemical resistance, and dimensional stability properties. In addition, Dynamask 5000 Series has been specifically formulated to be compatible with no clean and aqueous based fluxes and solder pastes. Dynamask 5000 incorporates several other “key” performance properties including excellent resolution, wide process latitude (tenting, lamination, exposure), high gloss, low odor, low light bleed, and improved scratch and solvent resistance.

Dynamask 5000 Series film is a transparent, high gloss, forest green material which is supplied in thicknesses of 75 microns (3.0 mils) and 100 microns (4.0 mils). The photopolymer layer is coated as a defect-free film and sandwiched between a 25 micron (1.0 mil) polyester coversheet and a 25 micron (1.0 mil) polyethylene release sheet.



Advantages

- Compatible with no clean and aqueous based fluxes and solder pastes
- Wide lamination process latitude
- High gloss, forest green finish
- Scratch resistant, flexible film for greater tented via hole integrity
- Meets or exceeds all the requirements of IPC-SM-840B Class 3 and IPC-SM-840C Class T&H, MIL-P-55110D and Bellcore
- Excellent resolution capabilities
- Utilizes epoxy based chemistry for excellent physical, chemical, mechanical, and electrical resistance properties

Uses

Dynamask 5000 Series is designed for use as a permanent solder mask on rigid printed wiring boards using either epoxy or polyimide laminates and copper or tin/lead circuitry. The excellent physical, chemical and electrical properties of this epoxy based material provide environmental protection for printed wiring boards, both during and after assembly soldering.

Application

Solvent free and 100% solids, Dynamask 5000 Series film is applied using conventional yellow room processes. Processing techniques include:

- PC board surface preparation
- Vacuum lamination
- Exposure
- Development
- Curing

Dynamask 5000 Series has been tested in a variety of assembly soldering operations using water soluble, RMA and no clean solder paste and wave soldering flux chemistries. If required, defluxing should be carried out utilizing either high temperature water wash, low concentration neutralizing aqueous rinse or 1,1,1-trichloroethane based solvents. Shipley does not recommend the use of high concentrations of alkaline saponifying cleaners or methylene chloride for defluxing this material.

Typical Properties

Physical Properties—Unexposed Film

Property	Test Method	Requirement	Value
Appearance	Visual	None	Transparent, high gloss green photopolymer
Solids Content	ASTM D-1259	None	100%

Material Properties—Cured Film

Property	Test Method	Requirement	Value
Appearance	Visual	None	Dark green, high gloss finish
Visual	IPC-SM-840B 4.8.1	A max of 1 imperfection/in ² which does not bridge more than one conductor. No encroachment of foreign material (Class 3).	Pass. Less than one imperfection/in ² both before and after soldering
Dimensional	IPC-SM-840B 4.8.2 TM 2.1.1	0.7 mil minimum	Pass. Dependent upon Dynamask thickness and circuit height
Non-Nutrient	IPC-SM-840B 4.8.1.1 TM 2.6.1	No support of, contribution to, or degradation by biological growth.	Pass
Curing	IPC-SM-840B 4.8.5	Meet requirements of IPC-SM-840B 3.6.1, 3.7.1, 3.7.2, and 3.7.3.	Pass (See Chemical and Soldering Properties)

Physical Properties—Cured Film

Property	Test Method	Requirement	Value
Adhesion	IPC-SM-840B 4.8.4.1 TM 2.4.28	Class 3	Pass (Before and after soldering)
Bare Copper		0% Removed	0%
Bare Laminate		0% Removed	0%
Melting Metals		Max 10% Removed	<4%
Machinability	IPC-SM-840B 4.8.1.2	No cracks or tears due to normal machining	Pass
Abrasive Resistance Taber	IPC-SM-840B TM 2.4.27.1	50 cycles min. (Class 3)	>50 cycles
Pencil Hardness	IPC-SM-840B TM 2.4.27.2	F (min.)	4H

Chemical Resistance Properties—Cured Film

Chemical	Test Method	Requirement	Value
Resistance to Solvents	IPC-SM-840B 4.8.6	No surface roughness, tackiness, blistering or color change.	
Isopropanol (boiling vapor)		Pass	Pass
1,1,1-trichloroethane (boiling vapor)		Pass	Pass
96% 1,1,1-trichloroethane, 4% isopropanol (boiling vapor)		Pass	Pass
TSP solution (pH = 13.0)		Pass	Pass
3% Alpha 2210 at 60°C		Pass	Pass
10% alkaline detergent (40% alkanolamine, 20% butoxyethanol, 20% glycol ether and 20% water) at 60°C		Pass	Pass
Fluxes	IPC-SM-840B 4.8.6	No surface roughness, tackiness, blistering or color change.	
Air-Brite 1		Pass	Pass
Argus 855		Pass	Pass
Ardrox		Pass	Pass
Kester 185		Pass	Pass
Alpha 850-33		Pass	Pass
Lonco 7733-TA		Pass	Pass
Hydrolytic Stability	IPC-SM-840B 4.8.7 T.M. 2.6.11	No irreversible change of state.	Pass (>28 days)
Flammability Rating	Underwriters Laboratories 94 Flame Class Test	IPC-SM-840B 4.8.8 UL 94 V number shall not be raised.	94V-0
2.3 mil film thickness		94V-0	94V-0
0.025 in FR-4 laminate thickness		94V-0	94V-0
2.3 mil film thickness		94V-0	94V-0
0.062 in FR-4 laminate thickness		94V-0	94V-0

Soldering Properties—Cured Film

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Property	Test Method	Requirement	Value
Solderability	IPC-SM-840B 4.8.9.1 inspected to IPC-5-804	The solderability of the board shall not be diminished.	Pass
Solder Resistance	IPC-SM-840B 4.8.9.2	Solder shall not adhere to the solder mask.	Pass (>10 sec.)
Soldering/Desoldering	IPC-SM-840B 4.8.9.3	No separation from base laminate or conductors beyond area of fused coating.	Pass (No separation under 7x magnification)

Electrical Properties—Cured Film

Property	Test Method	Requirement	Value
Dielectric Strength	IPC-SM-840B 4.8.10.1 TM 2.5.6.1	500 VDC peak/mil min.	3.0 mil: 1842 volts/mil 4.0 mil: 2976 volts/mil >1 x 10 ¹² ohms
Insulation Resistance	IPC-SM-840B 4.8.10.2 TM 2.6.3.1	5 x 10 ⁸ ohms (Class 3 min.)	
Dielectric Constant			3.56
Dissipation Factor			0.038

Environmental Properties—Cured Film

Property	Test Method	Requirement	Value
Moisture/Insulation Resistance	IPC-SM-840B 4.8.10.3 TM 2.6.3.1	5 x 10 ⁸ ohms (Class 3 min)	3.0 mil: 2.6 x 10 ⁹ ohms 4.0 mil: 2.5 x 10 ⁹ ohms Pass
Electromigration Resistance	IPC-SM-840B 4.8.10.4 TM 2.6.14	None allowed (Class 3)	Pass
Thermal Shock	IPC-SM-840B 4.8.11 TM 2.6.7.1	No blistering, crazing or delamination after 100 cycles.	Pass (>100 cycles)

Handling Precautions

Before using this product, consult the Material Safety Data Sheet for details on product hazards, recommended handling precautions, and product storage.

Storage

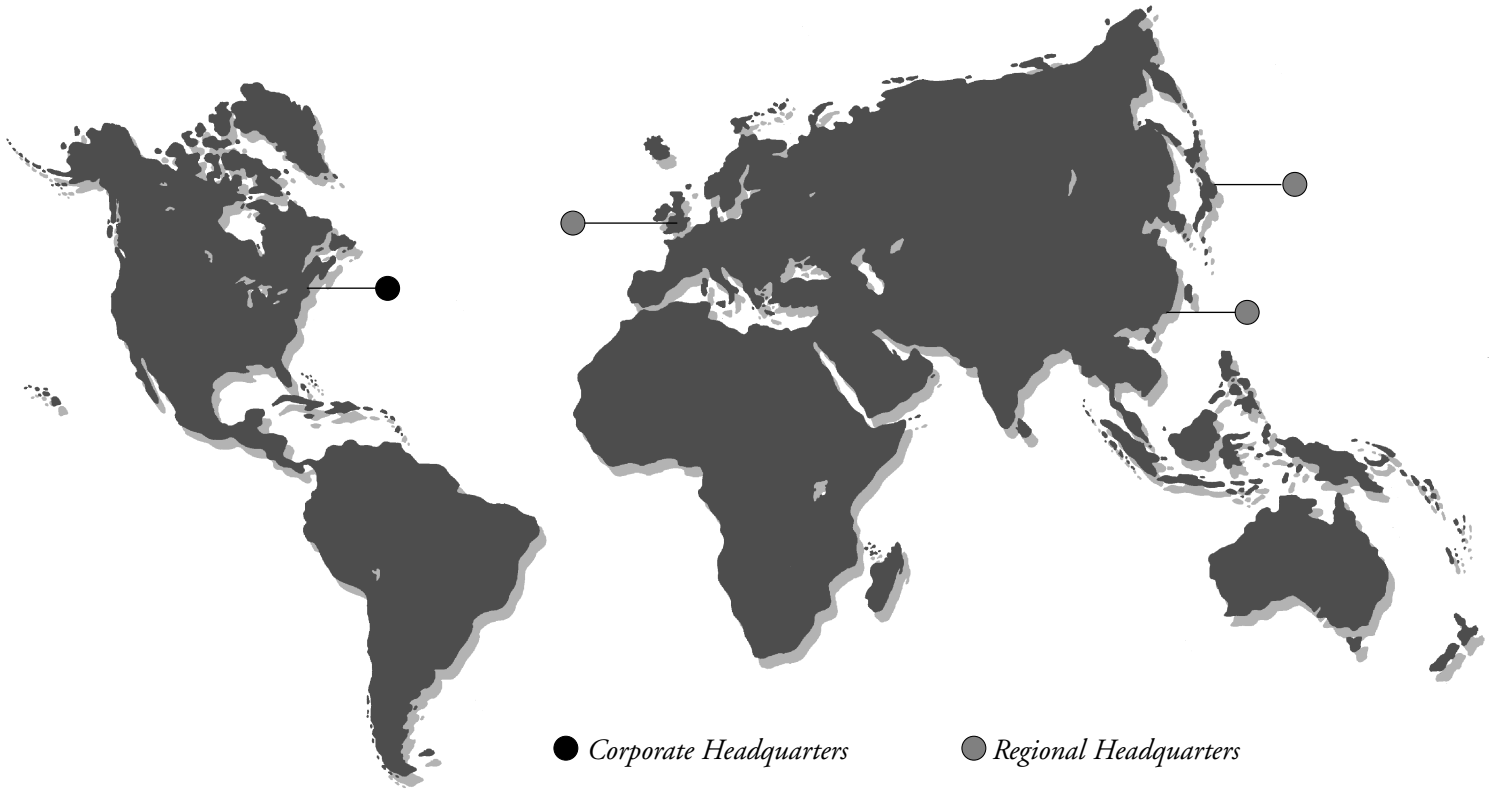
Store Dynamask 5000 in accordance with the finished product container label.

Waste Treatment

It is the user's responsibility to verify that treatment procedures comply with federal, state and local regulations. Contact your Shipley Technical Representative for more information.

Due to the nature of Dynamask 5000, disposal of it, or residues therefrom, should be made in compliance with federal, state and local environmental regulations.

Shiple Company Worldwide



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