ENTHONE 50 SERIES CAT L INK

Legend Ink

Product Code: ######

DESCRIPTION

ENTHONE 50 Series Cat L Inks are permanent, two component, epoxy-based screen printing inks. They may be used with a selection of catalysts which cure at elevated and/or room temperatures. When properly applied and cured, **Cat L Inks** have excellent adhesion to photoimageable, thermal and UV solder masks, glass, metal and plastic. They have excellent chemical and thermal resistance properties.

ENTHONE 50 Series Cat L Inks are used in the electronic, aerospace, automotive, appliance and decorative container industries. Uses include the permanent marking of circuit boards, semiconductor components, connectors, dials, nameplates, edge-lit panels, chassis, glass and thermoplastics.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

PHYSICAL PROPERTIES

COLOR NUMBERS AND MIX RATIOS

Ink Number	Color	Recommended Catalyst	Mix Ratios Catalyst Additions Parts by Weight per 100 Parts Ink	
			All Catalysts (except Catalyst 5)	Catalyst 5 Only
50 100R	White	9	6.0	8.5
50 110RX	White, Matte	9	5.0	NR
50 120R	Hi-Hide White	9	4.5	7.0
50 201AR	Lemon Yellow (Cadmium)	*	6.0	8.5
50 202BR	Medium Yellow (Chromium) [1]	*	6.0	8.5
50 206R	Orange (Chromium)	*	6.0	8.5
50 300R	Emerald Green (Cadmium)	*	6.0	8.5
50 301R	Deep Green (Cadmium)	*	7.0	9.5
50 400R	Ultramarine Blue	*	6.5	9.0
50 403R	Light Blue	*	6.0	8.5
50 506BR	Deep Red (Chromium)	*	6.0	8.5
50 507R	Medium Red (Cadmium)	*	6.0	8.5
50 508R	Medium Red (Chromium)	*	6.5	9.0
50 600R	Chocolate Brown (Chromium)	*	7.0	9.5
50 700R	Black [2]	*	7.0	9.5
50 710R	Black, Matte [2]	*	4.0	NR
50 770R	Black, Matte (Nonconductive)	B-13/28	6.5	NR
50 771R	Black, Gloss (Nonconductive)	*	6.0	8.5
50 800R	Clear, Gloss	*	9.0	11.5
50 810R	Clear, Matte	*	6.0	8.5

[1] For laser marking *Use any catalyst listed in Catalyst Description Section.

[2] Not intended for electrical applications.

CATALYST DESCRIPTION

Catalyst	Description	Cure	Average Pot Life (hours)
20/A	Basic air cure catalyst. Cures at room temperature in 5 to 7 days. Tack free after 1 to 2 hours. May also be heat cured.	R.T. or Heat	2
B 3	Basic heat cure only catalyst. Higher cure temperatures decrease cure time.	Heat	4
5	Long pot life. Excellent adhesion properties. Special mix ratios are required for this heat cure only catalyst (refer to Color Numbers and Mix Ratios Section).	Heat	24 Max*
9	Basic heat cure only catalyst with good anti-yellowing resistance. (Recommended for use with 50-110RX).	Heat	7
B 13/28	Accelerated air cure catalyst. Cures at room temperature in 3 days. Shorter pot life.	R.T. or Heat	1
45	Long pot life. This heat cure only catalyst contains adhesion promoters. Provides excellent adhesion to glass and metals with good water resistance. Slightly decreases solvent resistance.	Heat	12
77	Adhesion promoting catalyst. Cures at room temperature in 5-7 days. Provides similar characteristics as Catalyst 45. Maximum adhesion is achieved by heat cure @ 65.6 to 93.3 °C (150 to 200 °F).	R.T. or Heat	1

* Note: When using Catalyst #5 discard ink after 24 hours.

MAKE UP PROCEDURE

MIXING INSTRUCTIONS

Measure ink and catalyst at the proper mix ratio (refer to Color Numbers and Mix Ratios Section). Both the ink and catalyst should be weighed accurately. Excessive and insufficient amounts of catalyst are detrimental to cured ink film properties. Mix thoroughly without introducing excessive amounts of air. Avoid the use of paper or wax coated cups. Stir from bottom of the container.

OBSERVE INDUCTION PERIOD

All catalysts: 30 minutes

Catalysts 45 and 5: 60 minutes

Allow ink/catalyst mixture to stand for at least 30 minutes prior to application. This provides an induction period ensuring a homogenous mix of resin and catalyst and allows any entrapped air to escape from the mixture. The average pot life begins after the induction period.

APPLICATION

50 000 Series inks may be applied by screen printing, spraying, brushing and roller printing. To ensure optimum adhesion, it is imperative that the surface to be printed is clean and free of any residues or particulates.

OPTIONAL ADDITIONS

Additions of thinner or flow agents should always follow the induction period. If the induction period is not observed, the thinner or flow agent may interfere with the catalyzation process and could affect the final cured properties.

POT LIFE

Pot life will vary with the catalyst used (refer to Catalyst Description Section). To avoid waste, mix only an amount which can be consumed before the end of the pot life. High ambient temperatures will shorten the pot life. Solvent additions will increase the pot life.

Catalyst 45 and 5 have the longest pot life (12 hr. and 24 hr. max respectively), however cure temperature requirements must be observed (see Recommended Cure Section). Catalyst # 5 has special pricing (Contact your local distributor for pricing information).

SHELF LIFE

ENTHONE 50 Series Inks: 3 years from date of manufacture

All Catalysts: 2 years from date of manufacture

NOTE: Catalysts are hygroscopic. Containers should be kept tightly closed after each use to prevent moisture contamination.

EQUIPMENT

SCREEN PRINTING

FABRIC

Monofilament polyester or metallized polyester fabrics with a mesh count from 180 to 350 are recommended. Equivalent stainless steel fabrics may also be used. Mesh tension should be to fabric manufacturer's recommendations.

SQUEEGEE MATERIAL

Squeegees should be between 60 to 80 durometer, sharp and free of nicks. Squeegee durometer, pressure, angle and print speed should be adjusted according to the overall printing parameters to ensure consistent print definition and ink film thickness.

STENCIL MATERIAL

Any lacquer resistant Direct, Indirect, Direct/Indirect or Capillary Stencil system.

THINNING

If thinning is required, add small amounts of AD2001 or butyl cellosolve acetate. Additions should be made after the induction period. Thinner additions extend the pot life.

RETARDING

Small amounts of AD2003 or carbitol acetate are recommended. Additions should only be made after the induction period has been observed.

SPRAYING

Following the induction period, thin with AD2002 or a blend of 80% PM glycol ether and 20% methyl isobutyl ketone at 25 to 50% by volume, depending on air pressure and orifice of spray unit. Thinner additions will extend the pot life considerably.

CLEANING / REMOVAL

Clean screens / equipment before the ink dries and partially cures.

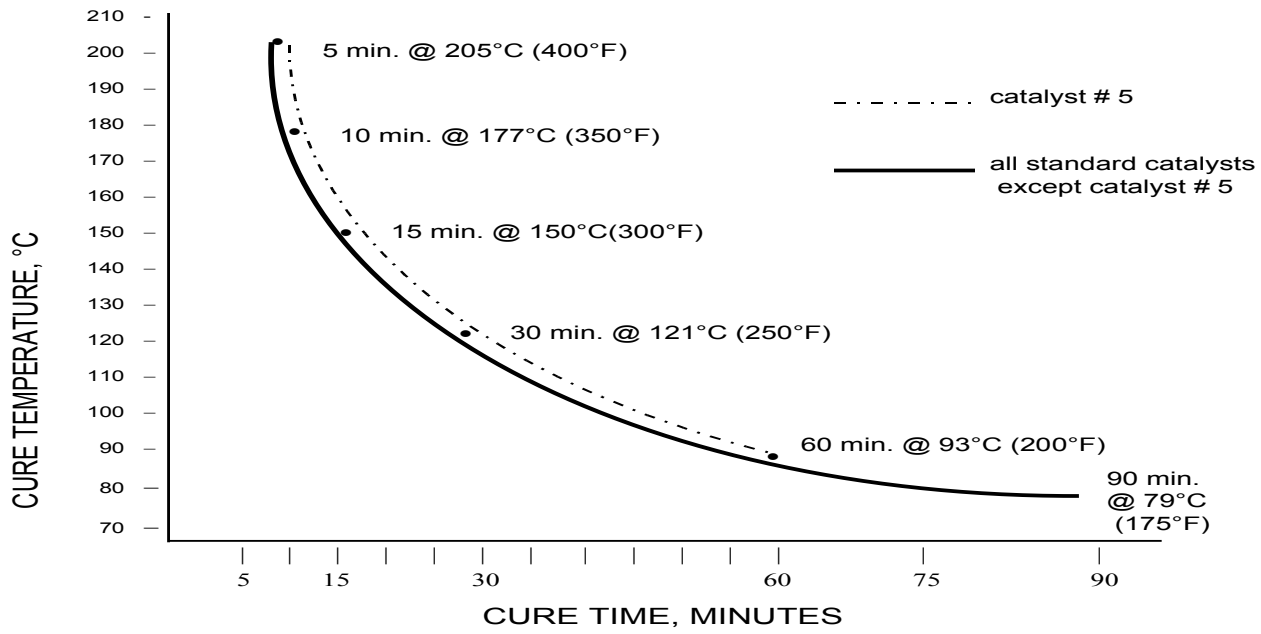
Screen Cleaning with Stencil Removal: Use Enthone SC1710, PC7804, or PC7886. Requires post water rinsing to remove surfactants.

Screen Cleaning without Stencil Removal or Equipment Cleaning: Use AD2001, AD2002, AD2003, or other strong oxygenated solvents without surfactants that require post water rinsing.

OPERATING PARAMETERS

RECOMMENDED CURE

CURE SCHEDULE



ADDITIONAL CURE INFORMATION

Cure schedules denote times/temperatures for curing ink film only. Allow additional time for the substrate to reach the actual cure temperature. Convection ovens should have sufficient exhaust and air movement to ensure solvent removal.

Cure temperatures above 79 °C (175 °F) are required for Catalysts B 3 or 45.

Cure temperatures above 93 °C (200 °F) are required for Catalyst 5.

Air cure Catalysts 20/A, B-13/28 and 77 provide a tack-free ink surface after 1 to 1.5 hours, depending on the ink film thickness. A tack-free surface is not an indication of cure. When using an ambient cure, articles should be racked and/or spaced to allow air circulation for the designated cure schedule. Do not box, bag, or package until the recommended cure time has been observed. Hot air blasts can be used to expedite handling. These catalysts may be fully or partially heat cured. Heat cure enhances the final cured properties**. Enthone 50 Series Cat L Inks** may also be cured by infrared radiation.

Recommended cured ink film thickness should be between 0.7 to 1.4 mils (0.017 to 0.035 mm).

An extended cure of 30 min. @ 150 °C (300 °F) will result in low outgassing properties.

Cured Electrical Properties

Property	Value *	Test Method
Insulation resistance, ohms		Mil I 43553A
@ 25 °C, initial reading		¶ 3.10 4.5.2.5
50 700R	$1.4x10^{8}$	
50 710R	1.2×10^{4}	
50 770R	$> 1.0 \times 10^{12}$	
50 771R	$> 1.0 \times 10^{12}$	
All Other Colors	$> 1.0 \times 10^{12}$	
Insulation resistance, ohms		Mil I 43553A
after humidity conditioning		¶ 3.10 4.5.2.5
@ 77 ±10 °F and 95% RH for 48 hours		
50 700R	1.7×10^{8}	
50 710R	1.2×10^{4}	
50 770R	$>1.0 \times 10^{10}$	
50 771R	$>1.0 \times 10^{10}$	
All Other Colors	$>1.0 \times 10^{10}$	

* All test samples were cured at 121 °C (250 °F) for 30 minutes. Variations in the cure schedule will affect electrical properties.

QUALIFICATIONS

Qualification information to Mil I 43553 & replacement C.I.D. A-A-56032 available upon request. Please contact your local representative.

ELECTROLESS NICKEL IMMERSION GOLD (ENIG) PROCESSING

In printed wiring board applications with electroless nickel immersion gold (ENIG) as the final surface finish nomenclature ink application must occur after the ENIG process. Processing the 50 Series inks through ENIG will hold up to the ENIG process, however during high heat assembly operations color change effects will occur with the white inks. Other colors can also be effected to a lesser extent. Please contact your local representative for additional information.

ACCESSORY PRODUCT DESCRIPTION

AD2001	Thinner for nominal adjustments in viscosity. Incrementally add 3 to 6% by weight.
AD2002	Thinner for spray applications. Add 25 to 40% by volume.
AD2003	Retarder to extend open time. Incrementally add 3 to 6% by weight.
AD3002	Flow agent to eliminate crawling, pin-holing and bubbling. Incrementally add 2 to 4% by weight. Mix gently to avoid over mixing.

SAFETY & WARNING

MacDermid Enthone recommends that the company/operator read and review the Safety Data Sheets for the appropriate health and safety warnings before use.

Safety Data Sheets are available from MacDermid Enthone.

WASTE TREATMENT

Prior to using any recommendations or suggestions by MacDermid Enthone for waste treatment, the user is required to know the appropriate local/state/federal regulations for on-site or off-site treatment which may require permits. If there is any conflict regarding our recommendations, local/state/federal regulations take precedent.

ORDER INFORMATION

Product	Code
Enthone 50 Series Cat L Ink	

CONTACT INFORMATION

To confirm this is the most recent issue, please contact MacDermid Enthone

macdermidenthone.com/electronics

North America	Europe	Asia
245 Freight Street Waterbury, CT 06702, USA 203.575.5700 americas@macdermidenthone.com	Elisabeth-Selbert-Str. 4 40764 Langenfeld, Germany 49.2173.8490.0 europe@macdermidenthone.com	8/F., Paul Y. Centre 51 Hung To Road Kwun Tong, Kowloon, Hong Kong 852.2499.7299 asia@macdermidenthone.com

Also read carefully warning and safety information on the Safety Data Sheet. This data sheet contains technical information required for safe and economical operation of this product. READ IT THOROUGHLY PRIOR TO PRODUCT USE. Emergency directory assistance Chemtrec 1 - 800 - 424 - 9300.

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