

ADE Series Epoxy Screen Ink

ADE Series epoxy solvent based screen ink has been formulated with high quality epoxy resins for excellent adhesion to metals, glass and a wide range of hard to print substrates. ADE Series is ideal for electronic and industrial applications and provides outstanding solvent, chemical and abrasion resistance. ADE is a two part ink and must be initiated with a catalyst prior to use. ADE ink exhibits a high gloss finish. ADE Series is for indoor applications only.

Substrates

- Metals
- Glass
- PC boards
- Epoxy
- Melamine
- Treated polyethylene
- Treated polypropylene

Substrate recommendations are based on commonly available materials intended for the ink's specific market when the inks are processed according to this technical data. While technical information and advice on the use of this product is provided in good faith, the User bears sole responsibility for selecting the appropriate product for their end-use requirements. Reference the Quality Statement at the end of this document.

User Information

Mesh

200-305 tpi (78-120 tpcm) monofilament polyester mesh or stainless steel mesh for most applications

Stencil

Use direct emulsions and capillary films which are solvent resistant

Squeegee

70-80 durometer polyurethane squeegee

Coverage

Estimated 1,200-1,800 square feet (111-167 square meters) per gallon depending upon ink deposit. Reference www.HittMarking.com for examples of coverage calculations.

Printing

Ink Preparation: ADE Screen Ink is a two-part ink and must be initiated with a catalyst prior to use. Various catalysts can be used; see the 'Additives' section. The amount of catalyst should only be based on the weight of the ink and not include the weight of any other additives. Catalyzed ink requires an "induction period" or time lag of about 30 to 45 minutes to allow the catalyst to

become uniformly mixed and available for the polymerization (cross linking) process.

Add only enough ink to the screen to be able to print for 5-10 minutes. Add additional ink in small increments throughout the print run to maintain screen stability. Thoroughly mix the ink prior to printing. Improper mixing can lead to inconsistent color and ink performance.

Maintain ink temperature at 65°-90°F (18°-32°C) for optimum print and cure performance. Lower temperatures increase the ink viscosity, impairing flow and increasing film thickness. Elevated temperatures lower the ink viscosity, reducing print definition and film thickness.

Pretest to determine optimum printing parameters for a particular set of ink, substrate, screen, press, and curing variables/conditions.

Hitt Marking does not recommend inter-mixing of ADE Series with other inks besides the ADE Series.

Pad Printing

ADE Inks can be pad printed. The use of thinners or retarders may be required to achieve the correct transfer. Please follow the printing and drying guidelines.

Drying / Curing Parameters

ADE inks crosslink or cure over time as the residual solvent is evaporated from the printed ink film. ADE inks dry to the touch before the ink film achieves full cure to exhibit required adhesion, chemical resistance and surface hardness. At lower temperatures, drying and curing takes place over longer periods of time; whereas elevated temperatures speed up the process. At any temperature, it is necessary to maintain good air circulation to remove the vaporized solvents. Residual solvents in the air inhibit the drying/curing process. Multiple layers of ink may require longer drying times than a single layer.

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The following are starting point guidelines to determine temperature and times to achieve a crosslinked ink film.

Room Temperature: ADE Series dries to touch in approximately 30-60 minutes and cures in 5-7 days.

Force-Drying/Curing: Baking ADE prints produces the hardest, most durable finish.

Bake most ADE printed colors for approximately 10 minutes at a maximum range of 300°-325° F (150°-164°C). Temperatures above 325°F (164°C) may result in discoloration.

Bake the following colors at a maximum range of 150°-250°F (66°-121°C): ADE10 Primrose Yellow, ADE11 Lemon Yellow, ADE12 Medium Yellow, ADE20 Brilliant Orange, ADE80 Process Yellow, ADE361 Yellow and ADE456 Process Blue. Pigments used in these colors are not stable at temperatures above 250°F (121°C). Baking these colors above the recommended temperature may result in discoloration or color bleeding. Overprinting these colors with other colors which can take higher temperatures (such as white), and baking at higher temperature is not recommended.

Additives

Any additives should be thoroughly mixed before each use. Prior to production, test any additive adjustment to the ink. Inks containing additives should not be mixed with other inks.

Reducer/ Retarder: Use RE190 Thinner to reduce the viscosity of these inks for best printing results. Add up to 15% by weight.

Use RE189 Slow Thinner to reduce the viscosity and slow drying of these inks. Add up to 15% by weight.

Add RE182 Retarder sparingly to prevent drying in the screen in hot environmental conditions.

Catalyst: The amount of catalyst should only be based on the weight of the ink and not include the weight of any other additives. Catalyzed ink requires an "induction period" or time lag of about 30 to 45 minutes. Catalyzed ink has a pot life of 6 to 8 hours.

ADE677 Catalyst: add 1 part catalyst to 5 parts ink by weight.

ADE176 Catalyst (formerly ER176 Catalyst): add 1 part catalyst to 4 parts ink by weight.

Use ADE678 Glass Catalyst for printing on glass or when metallic pigments are used: add 1 part catalyst to 5 parts ink by weight. Prints may be air dried but will require 7-days for full cure and maximum adhesion, chemical and water resistance.

Use ADE679 Snowboard Catalyst for printing on polyethylene materials used in the lamination and manufacture of snow skis and snowboards: add 1 part catalyst to 5 parts ink by weight. Prints may be air dried or force air dried at lower temperatures which do not affect the snowboard material. Prints should be racked and allowed to chemically react at least 4 days before laminating.

Flow Control: CARE8 Flow Control Agent may be added from ½% to 1% by weight to the ADE inks.

Clears / Varnishes

Mixing Clear: Use ADE26 Mixing /Metallic Clear to reduce the density of colors or as a clear base for specialty additives such as Metallic additives.

Heavy Body Base: Use ADE90 Heavy Body Base may be added to ADE inks when printing halftones and fine details.

Cleanup

Screen Wash (Prior to Reclaim): Use IMS201 Premium Graphic Screen Wash, IMS203 Economy Graphic Screen Wash, or IMS206 Graphic Auto Wash

Press Wash (On Press): Use IMS301 Premium Graphic Press Wash.

Storage / Shelf Life

Store closed containers at temperatures between 65°-78°F (18°-25°C). Storing products outside of these recommendations may shorten their shelf life. Ink taken from the press should not be returned to the original container; store separately to avoid contaminating unused ink.

Standard ADE Series items are useable for a period of at least 48 months from the date of manufacture. To obtain the official shelf life letter, Contact Hitt Marking Devices Technical Service at sales@hittmarking.com or see contact listing at the end of this document.

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General Information

Ink Handling

All personnel mixing and handling these products must wear gloves and eye protection. Clean up spills immediately. If ink does come in contact with skin, wipe ink off with a clean, dry, absorbent cloth (do not use solvent or thinner). Wash the affected area with soap and water. Consult the applicable Safety Data Sheet (SDS / MSDS) for further instructions and warnings.

For assistance on a wide range of important regulatory issues, consult the following Regulatory Compliance Department link at <http://www.HittMarking.com> or contact Hitt Marking Devices listing at the end of this document).

Adhesion Testing

1. Touch of ink surface - the ink surface should be smooth and slick.
2. Thumb twist - the ink surface should not mar or smudge.
3. Scratch surface-the ink surface should resist scratching.
4. Cross hatch tape test -per the ASTM-D3359 method, use a cross hatch tool or a sharp knife to cut through ink film only; then apply 3M #600 clear tape on cut area, rub down, and rip off at a 180 degree angle. Ink should only come off in actual cut areas.

Manufacturer's Product Offering

Based on information from our raw material suppliers, these ink products are formulated to contain less than 0.06% lead. If exact heavy metal content is required, independent lab analysis is recommended.

Standard Printing Colors

The Standard Printing Colors have excellent opacity.

4-Color Process Printing: When 4color process / halftone printing with the ADE Series, use the following colors: ADE90 Heavy Body Base, ADE456 HT Process Blue, ADE80 Process Yellow, ADE586 Permanent Process Red and ADE52 Opaque Black.

These colors have an opacity and viscosity of the standard printing colors, which is not typical of specific halftone printing colors. To increase the viscosity and decrease the density of these colors

to be more suitable for halftone printing, use the ADE90 Heavy Body Base.

Pantone Matching System® Base Colors

The Pantone Matching System® Base Colors are used to simulate the Pantone® Color Formulation Guide. These inks can be used directly from the container, used in color matches, or let down with mixing clear. The ColorStar® Color Management System software uses Pantone Matching System® Base Colors. These color formulations are also available at www.HittMarking.com.

Halogen - Free Colors

The halogen-free colors are press ready and may also be used to match special colors. These colors are free of the halogens Chlorine and Bromine based on supplier information and in compliance with the electronics industry standard, IEC 61249-2-21 (<http://www.iec.ch/>).

Special Effect Pigments

When inks are to be printed with a special effect color, all ink layers must be evaluated for inter coat adhesion before proceeding with the production run. Pigments may settle in the container; prior to printing, thoroughly mix the ink.

The following special effect pigments may be added to ADE Series. Contact Hitt Marking Devices for the item number(s) and availability of special effect products. Technical Data Sheets for each of the following special effect pigments can be found at www.HittMarking.com.

Metallic Silver (aluminum): Add up to 8% by weight. ADE678 is the recommended catalyst to use with metallic pigments.

Metallic Gold (bronze): Add up to 15% by weight. ADE678 is the recommended catalyst to use with metallic pigments.

Pearlescent/ Interference: Add up to 20% by weight.

Multi-Chromatic: Add up to 10% by weight.

Phosphorescent: Add up to 20% by weight.

Fluorescents: Add up to 25% by weight. Fluorescent colors fade quickly with exposure to ultraviolet light.

Color Card Materials

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The following is a list of available screen printed samples of the (Ink Series).

Conventional Color Card (CARD 375): shows the Standard Printing Color Pantone Matching System Base Colors, and Halftone Colors.

Halogen-Free Color Presenter (CARDHF): shows all the halogen-free colors.

Special Effects Color Card (CARDSPL): shows Metallic, Pearlescent, Interference, and Multi-Chromatic effects.

Physical Properties Test Results

These results were obtained by laboratory testing; this information is provided as a general indication of the ink performance, not as a specification or a guarantee.

ADE52 Opaque Black with 10% by weight RE190 Thinner and 20% by weight ADE677 Catalyst was printed on anodized aluminum using 65 threads per centimeter (195 threads per inch) plain weave mesh. A set of prints was dried at room temperature for 14 days; another set was baked for 5 minutes at 77°C (170°F) then allowed to cross link at room temperatures for 14 days.

Adhesion

Test: Cross-hatch tape (ASTM D3359)
Result: Pass

Gloss

Test: 60° meter >90
Result: Pass

Pencil Hardness

Test: Gardco/Wolff Wilborn Pencil Hardness Tester
Result: Pass H2 (air dried sample), Pass H3 (baked sample)

Impact Resistance

Test: Gardner Impact Tester, 1.2 cm (0.5 in) diameter, 454 gram (1 lb) weight dropped 75 cm (30 in)
Result: Pass

Heat Resistance

Test: 72 hours at 182°C (360°F)
Results: Pass; gloss decreased from 90 to 68 at 60°

Chemical Resistance

Test: 100 double rubs with MEK (methyl ethyl ketone), xylene, isopropyl alcohol, and mineral spirits

Result: Pass

Water Immersion

Test: 20 minutes (air dried sample), 50 minutes (baked sample)

Result: Pass

Abrasion Resistance

Test: Taber Abraser CS10 wheels, 500 grams 600 cycles (air dried sample), 300 cycles (baked sample)

Result: Pass

Packaging / Availability

Contact your Hitt Marking Devices for product availability and offering.

Standard Ink Items

Contact your distributor for available container sizes.

* These colors are not recommended for baking temperatures over 250°F (121°C).

Item Number	Color
ADE10	*Primrose Yellow
ADE11	*Lemon Yellow
ADE12	*Medium Yellow
ADE15	Yellow (GS)
ADE16	Yellow (RS)
ADE19	Fire Red
ADE20	*Brilliant Orange
ADE22	Ultra Blue
ADE26	Mixing/Metallic Clear
ADE315	Emerald Green
ADE435	Regal Blue
ADE456	*HT Process Blue
ADE503	Permanent Red Y
ADE52	Opaque Black
ADE578	Permanent Cerise
ADE586	Permanent Process Red
ADE62	Warm Red
ADE67	Reflex Blue
ADE75	Opaque White
ADE78	High Intensity White
ADE80	*Process Yellow
ADE82	Carmin
ADE83	Magenta
ADE84	Maroon

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ADE85	Green
ADE86	Blue (GS)
ADE87	Blue (RS)
ADE88	Violet
ADE89	Red Toner
ADE90	Heavy Body Base
ADE170	Clear Gloss

Pantone Matching System® Base Colors

Item Number	Color
ADE358	Tinting White
ADE359	Tinting Black
ADE360	Orange
ADE361	*Yellow
ADE362	Warm Red
ADE363	Rubine Red
ADE364	Rhodamine Red
ADE365	Purple
ADE366	Violet
ADE367	Reflex Blue
ADE368	Process Blue
ADE369	Green

Non-Standard Ink Items

Non-Standard ink items listed below are special order, non-inventoried colors which may require additional lead time. Contact your distributor for available container sizes.

Printing Colors

Item Number	Color
ADE81	Orange
ADE114	Brown
ADE172	Flat Clear
ADE405	BrilliantBlue
ADE568	Permanent Magenta

Halogen-Free Colors

Item Number	Color
ADE200	Halogen-Free Mixing Clear
ADE201	Halogen-Free Tinting Black
ADE202	Halogen-Free Tinting White
ADE205	Halogen-Free Super Opaque Black
ADE206	Halogen-Free Super Opaque White
ADE210	Halogen-Free Yellow
ADE211	Halogen-Free Orange
ADE212	Halogen-Free Red

ADE214	Halogen-Free Magenta
ADE215	Halogen-Free Maroon
ADE216	Halogen-Free Violet
ADE217	Halogen-Free Blue RS
ADE218	Halogen-Free Blue GS
ADE219	Halogen-Free Green

Additives / Reducers

Item Number	Item Description
ADE677	Catalyst
ADE678	Glass Catalyst
ADE679	Snowboard Catalyst
CARE8	Flow Control Agent
RE182	Retarder
RE189	Slow Thinner
RE190	Thinner
ADE176	Catalyst (formerly ER176)

Cleaners / Clean Up

Item Number	Item Description
IMS203	Economy Graphic Screen Wash
IMS206	Auto Graphic Screen Wash
IMS301	Premium Graphic Press Wash

Hitt Marking Devices Quality Statement

Hitt Marking Devices® stands behind the quality of this product. We cannot, however, guarantee the finished results because Hitt Marking Devices® exercises no control over individual operating conditions and production procedures. While technical information and advice on the use of this product is provided in good faith, the User bears sole responsibility for selecting the appropriate product for their end use requirements. Users are also responsible for testing to determine that our product will perform as expected during the printed item's entire - lifecycle from printing, post - print processing, and shipment to end - use. This product has been specially formulated for screen printing, and it has not been tested for application by any other method. Any liability associated with the use of this product is limited to the value of the product purchased from Hitt Marking Devices®.

Hitt Marking Devices

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