

HP Indigo ElectroInk

Frequently asked questions



What is HP Indigo ElectroInk?

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HP Indigo ElectroInk is a unique liquid ink used in all HP Indigo presses that combines the advantages of digital printing with the qualities of liquid ink. ElectroInk contains electrically charged pigmented particles in a liquid carrier. Digital printing is enabled through control of electrical fields to accurately place ink particles. Ink particles as small as 1-2 microns provide high resolution, uniform gloss at various coverages, sharp image edges, and very thin ink layers that closely follow the surface topography of the substrate.

The unique construction of ElectroInk makes it pigment-agnostic, so it can use the same base technology to create a wide portfolio of special colors. This also allows the mixing of spot inks to achieve the widest color gamut, reaching up to 97% of PANTONE® colors.

ElectroInk is supplied as a concentrated paste that is loaded into the press in tubular cartridges, in a “clean hands” operation. Inside the press it is automatically fed into ink supply tanks and diluted with oil, to form a fluid mixture of carrier liquid and colorant particles ready for printing.





HP Indigo ElectroInk resistance to light, temperature and chemicals

What is the lightfastness of prints produced with HP Indigo ElectroInk?

HP Indigo liquid electrophotography (LEP) technology is known for the highest print quality provided within digital printing technology. One of the main advantages of LEP technology is color stability, which is related to both press conditions (i.e. runs in different coverage and/or substrates), and storage conditions of the final product.

Q What is the lightfastness in indoor conditions?

A

More than 75% of photobooks worldwide are printed today using ElectroInk on HP Indigo high-quality presses. Papers printed with our regular CMYK ink set were tested for longevity at the independent print permanence institute, Wilhelm Imaging Research (WIR institute). The results verify the permanence of HP Indigo prints in indoor display conditions for up to 54 years before any noticeable signs of fading or changes in color balance, ahead of the top silver halide paper Fujicolor Crystal Archive, and much longer than standard silver halide papers. HP Indigo photobooks received an album/dark storage rating of greater than 200 years, compared with a maximum rating of more than 100 years for silver halide solutions.

Q What is the lightfastness in outdoor conditions?

A

In outdoor conditions, the stability to light exposure for common pigments tends to fade when UV radiation interacts with ink colorant.

Tests conducted to examine lightfastness performance of HP Indigo ElectroInks in outdoor conditions shows that using HP Indigo ElectroInk Fade Resistant Yellow, Fade Resistant Magenta, Fade Resistant Orange, and Violet for Packaging provides a complete set of CMYKOVG inks that reach Blue Wool Scale of 6-7.

The permanence lightfastness testing method developed in HP's state-of-the-art image permanence lab in San Diego, California uses custom image-permanence testing equipment to characterize the outdoor lightfastness of HP ElectroInk Fade-Resistant Yellow (Y), Magenta (M) and Orange (O) inks. The test was modeled after ISO-18930: Imaging materials – Pictorial color reflection prints – Methods for evaluating image stability under outdoor conditions.

The test consists of light and dark events in 24-hour cycles to simulate diurnal and nocturnal conditions. The print samples are exposed to a Xenon light – a match for direct outdoor daylight, using an Atlas machine.

To establish lightfastness, ink performance is compared to a blue-wool standard, composed of eight strips of fabric. The failure criteria used with HP Indigo ElectroInk is based on the Blue-Wool Scale (BWS). This colorimetric scale accounts for any color change, no matter how small. The permanence rating corresponds to the strip on the blue-wool standard that has faded to the same extent as the sample.

The lightfastness of synthetic substrates is less vulnerable compared to paper substrates.

Summary of outdoor test results in Blue Wool Scale (BWS):

Regular CMYK ink set

Ink	C	M	Y	K	O	G	V
BWS	7	3-4	3	6-7	3-4	7	3

*Tested on a thick coated paper (Arjo 300 gsm) and a thick synthetic substrate (PET 175u)

Fade resistance ink set

Ink	C	Fade resistant magenta	Fade Resistant Yellow	K	Fade Resistant Orange	G	Violet for Packaging
BWS	7	6-7	6-7	6-7	6-7	7	6-7

*Tested on a thick coated paper (Arjo 300 gsm) and a thick synthetic substrate (PET 175um). For more information regarding HP Indigo Fade Resistant ElectroInks, Please refer to HP PrintOS Knowledge Zone at printos.com/knowledge-zone/#/view/asset/30433?businessUnit=Indigo

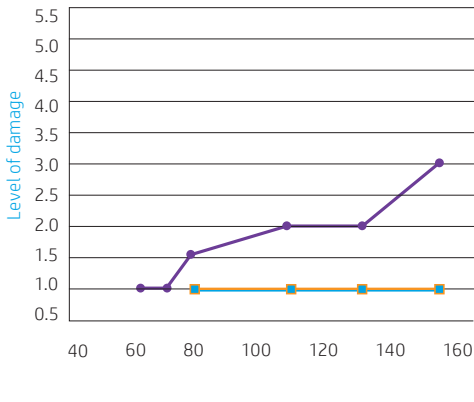
Q What is the heat resistance of HP Indigo ElectroInk prints?*

A

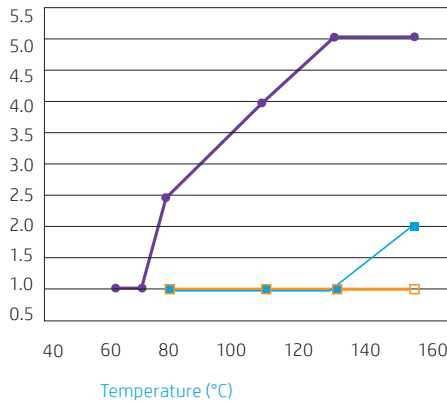
* Heat resistance: The ability of materials to withstand excessive heat, which may result in reduced flexibility, strength, and resistance to natural decay through loss of moisture, as well as acceleration of decomposition reactions.

The test for heat resistance measures the visible changes to print quality when two facing sheets, positioned so that the ink on one comes into contact with the ink on the other, are exposed to increasing temperatures (ranging from 60°C - 140°C / 140°F - 284°F) under a steady pressure of 645 Pascal. The prints were tested after one hour of exposure. The test is a qualitative analysis based on the examiner’s visual evaluation of the degree of damage on a scale from “no damage” to “strong damage”. The tests were executed using ElectroInk technology, Xerography technology (Dry EP) and offset inks on various types of paper, to simulate a variety of typical substrates.

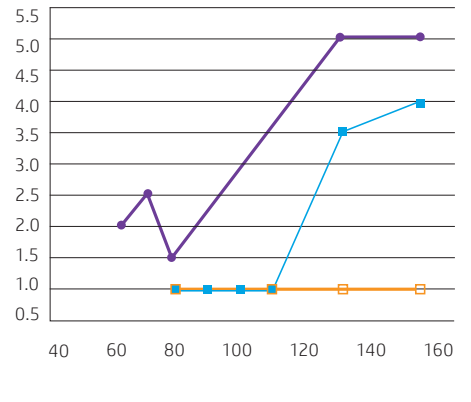
Heat resistance uncoated - 1 hour



Heat resistance coated matte - 1 hour



Heat resistance coated gloss - 1 hour



HP Indigo Offset Xerography

Q How does HP Indigo ElectroInk withstand freezing conditions?

A HP Indigo ElectroInk is suitable for use under refrigerator conditions (-18°C). However, the use of primer can impact the printed product behavior under these conditions, and requires specific testing of the full application solution.

HP Indigo ElectroInk behavior at low temperatures has been tested under varied conditions. Ink cans were held overnight at -42°C (-43.6°F), and for 30 minutes at -70°C (-94°F), and at -170 °C (-274°F). Test results show that compared to the reference sample, the tested prints appeared identical under all conditions.

Q What is the chemical stability of HP Indigo ElectroInk on print?

A HP Indigo ElectroInk resistance to various physical and chemical agents on different substrates was tested according to international ISO and BS standards ISO. (ISO 2836 - Print and printing inks Assessment of resistance to various agents, ISO 2837 - Print and printing inks, Assessment of resistance to solvents, BS 4321- Methods of test for printing inks, resistance of prints to various physical and chemical agents). Print resistance was tested with the following agents: Water, alkalis/bases ,acids ,oils and fats ,spices, detergents, soaps, wax and organic solvents. The test samples were printed with the process inks (CMYK) and the reference samples with oil base offset ink in a conventional press. The test samples were brought into static contact with the agent used under defined conditions. Any change in print or in the receptor surface was reported: change in color values (DE*, L*, a*, b*), OD difference, changes observed in the substrate, changes of the agent used for the test (color, PH, etc.).

The results show that in solvent or water-based solutions, stability is generally good ($dE \leq 1$) for all colors. In basic solutions, MCK are visibly slightly poorer ($1 \leq dE \leq 5$), and Y is very poor ($dE \geq 30$), HP Indigo ElectroInk Fade Resistant Y showed a much higher stability also in basic solutions. In acid solutions, all colors are slightly worse and it's visible to the human eye ($1 \leq dE \leq 5$). In oils, chemical stability changes according to oil chemistry (gasoline- very good $dE \leq 1$, cooking oil $1.5 \leq dE \leq 5$).

HP Indigo ElectroInk rub resistance

Q How does HP ElectroInk's rub resistance rate?

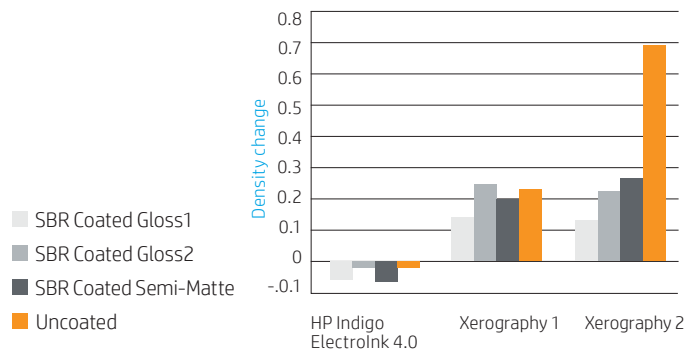
A HP Indigo ElectroInk's rub resistance is tested by measuring ink optical density (OD) on print before and after the rubbing test. The measured difference in optical density defines the amount of loss of print image accrued during the test – the greater this number, the greater the loss. The printed image is rubbed against the same kind of non-printed substrate using the Sutherland Ink Rub Tester (www.rubtester.com) with a 1.8 kg (4 lb) weight for 440 strokes.

The test for rub resistance was performed by the Rochester Institute of Technology (www.rit.edu) under laboratory conditions as a simulation of onsite printing according to ASTM D5264-98 (2004) "Standard Practice for Abrasion Resistance of Printed Materials by the Sutherland Rub Tester", and according to Tappi Test Method T 830 om-04 "Ink Rub Test of Container Board".

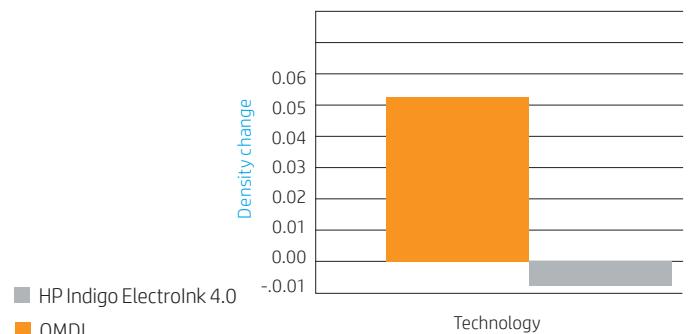
The tests were performed on four different types of substrates, simulating accepted types of coated and uncoated gloss and matte papers. Print samples were taken from the HP Indigo press using HP Indigo ElectroInk as well as the Xerox iGen3, the Kodak Nexpress and the Heidelberg QMDI.

Test results from the Rochester Institute of technology show that "HP Indigo ElectroInk had the highest resistance" in comparison to the Xerography technologies, as seen in the charts below:

Change in image density
(HP Indigo ElectroInk vs. Xerography)



Change in image density (HP Indigo ElectroInk vs. Offset) on SBR Coated Gloss



Q Are any additional products recommended to enhance the adhesion of HP Indigo ElectroInk to plastic substrates?

A For synthetic substrates, priming is required to ensure ink adhesion. Priming can be applied either inline or offline.

For approved primers and specific priming guidelines, please refer to the PrintOS Knowledge Zone at printos.com/knowledge-zone/#/view/asset/32531?businessUnit=Indigo

Substrates compatible with HP Indigo ElectroInk

Q What substrates can be used with HP Indigo Electroink?

A HP Indigo ElectroInk can address the widest range of media compatibility in the industry with more than 3250 certified substrates; from jobs printed on dark, transparent, recycled paper to synthetics and paperboard. For specific information please refer to PrintOS Knowledge Zone at printos.com/knowledgezone/#/results?q=how%20to%20guide&businessUnit=Indigo. For some uncertified paper, ink adhesion can be enhanced by use of the HP Indigo ElectroInk Primer as an additional ink layer. Exact performance depends on specific paper and requirements, and should be tested per case.

For specific substrate types and media brands please check the HP Indigo Media Solutions Locator on the customer portal at hp.com/go/medialocator.

HP Indigo ElectroInk for food packaging applications

Q Can HP Indigo ElectroInk be used for printing food packaging applications?

A Many of our customers around the world print flexible packaging and folding cartons, including food packaging, on HP Indigo presses using HP Indigo ElectroInk. HP Indigo ElectroInk is suitable for printing flexible packaging and folding cartons on the non-food contact side of the food packaging, under certain conditions of use and compliance with Good Manufacturing Practices (GMP). GMP is a framework of rules and regulations for all parties involved in the development of packaging and provides recommendations and requirements to maintain quality assurance and safety. For additional details please consult the “HP Indigo for Food Packaging Printing – Regulatory Overview” white paper. www8.hp.com/h20195/v2/GetPDF.aspx/4AA4-8153ENW.pdf

Under appropriate conditions of use, HP Indigo ElectroInk complies with:

- Federal Food Drug and Cosmetic Act 21 USC 201 (FFDCA)
- Article 3 of the EU Framework Regulation No. 1935/2004
- Good Manufacturing Practices of the EU 2023/2006
- Swiss Ordinance 817.023.21 (1.5.17)
- Council of Europe Resolution AP (2005)2 for printing inks
- Japanese Printing Ink Manufacturers Association Negative List
- Nestle Guidance Note on Packaging Inks (compositional compliance)
- EuPIA Guideline on Printed Inks; EuPIA Exclusion Policy
- EU REACH and RoHS regulations
- EU Packaging Waste Directive (94/62/EC)
- Conflict Minerals requirements
- EU Toy Standard EN71 (Parts 3, 9, 12)
- Heavy metals CONEG legislation

HP Indigo ElectroInk is free from:

- Phthalates, bisphenols and photoinitiators
- Aromatic amines
- Nanomaterials
- Materials subject to California Prop 65 labeling
- HAP – Hazardous air pollutants
- TAC – Toxic air contaminants
- Particulate matter emissions

As with any packaging that contains food, our customers are required to adhere to GMP and applicable FDA, EU and other relevant regulations. It is recommended that customers perform their own risk assessment and regulatory compliance determination of their product.

Q Can HP Indigo ElectroInk be used for printing food packaging for retort and microwave reheating applications?

A HP Indigo ElectroInk can be used for high-performance applications, like retort and microwave reheating packaging, under well-defined conditions of use and with selected substrates.

Please refer to the PrintOS Knowledge Zone for additional information on these specialized applications. www8.hp.com/h20195/v2/GetPDF.aspx/4AA4-8153ENW.pdf

Q Is HP Indigo ElectroInk compliant with Nestle requirements?

A HP Indigo customers around the world successfully print for Nestle and other leading national and international brands. HP Indigo ElectroInk is compositionally compliant with the Nestle Guidance Note on Packaging Inks, Version September 2016.

Q Are HP Indigo ElectroInks low migration inks?

A Low Migration Ink is not a regulatory designation, but rather describes an ink designed so that any migration that does occur meets regulatory requirements. As such, under well-defined conditions of use, HP Indigo ElectroInk is low migration, or more appropriately, migration compliant.





Regulatory and environmental aspects of HP Indigo ElectroInk

Q Is HP Indigo ElectroInk certified with the Intertek Green Leaf Mark?

A Intertek is one of the world's leading independent certification and testing companies. HP Indigo chose the Intertek Green Leaf Mark to demonstrate rigorous, independent verification of environmental claims associated with these presses.

The following HP Indigo digital presses have been certified for their superior environmental standing: HP Indigo 12000 Digital Press, HP Indigo 7900 Digital Press, HP Indigo 8000 Digital Press, HP Indigo WS6800 Digital Press, HP Indigo WS6800p Digital Press, and HP Indigo 5900 Digital Press. Learn more about the Intertek Green Leaf Mark at intertek.com/green/certification

Q Does HP Indigo ElectroInk comply with REACH regulation EC No 1907/2006?

A HP Indigo ElectroInk complies with EC Regulation 1907/2006 (REACH). The products do not contain any substances on the candidate list for inclusion in Annex XIV of REACH above the threshold level of 0.1% by weight of the article. Additional information about REACH can be found at <http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c05996997>

Q What is the concentration of heavy metals in HP Indigo ElectroInk?

A HP Indigo ElectroInk does not contain lead, cadmium, mercury or hexavalent chromium in a combined concentration exceeding 100 parts per million by weight of the ink in a dry state.

Q What is the flammability rating of HP Indigo ElectroInk?

A The oil in HP Indigo ElectroInk has a flashpoint greater than 64°C (147°F) and is not restricted for any mode of international transport.

According to the Hazardous Materials Identification System (HMIS) and the National Fire Protection Association (NFPA) system, the flammability of ElectroInk is rated at 2. (Moderate on a scale of 0 to 4).

For any specific workplace hazard warning and labeling requirements for these materials, please consult your local occupational health and safety regulations.

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Can HP Indigo prints be recycled?

As a leading printing equipment and supplies company, HP Indigo cares a great deal about the ease of recycling paper and print media. HP Indigo prints can be recycled into many useful fiber-based materials. Some recycling applications also require deinking (separation of ink from the fibers), and HP Indigo prints can be deinked in relevant recycling applications that require ink removal.

HP Indigo has been researching the deinking of its prints since 2004, with successful laboratory, pilot, and mill-scale results, which have been published in international forums. In addition to the successful full-scale trial in a European deinking mill in 2011, two near-mill-scale pilot trials were also conducted at Voith Ravensburg Fiber Systems Technology Center pilot plant in Ravensburg, Germany. This trial also showed that HP Indigo prints can be successfully deinked in standard mill operating conditions. The amounts of HP Indigo prints tested in the mill and pilot trials were far above what any standard deinking mill will likely encounter in the foreseeable future. Research has been conducted with leading paper research institutes including Centre Technique du Papier (CTP), Grenoble and Paper Technology and Mechanical Process Engineering (PMV), Darmstadt.

Deinking trial results

In November 2011, HP Indigo and Arjowiggins Graphic, an HP Indigo Preferred Media Partner, planned and conducted a full-scale mill trial using 5% HP Indigo prints at Arjowiggins' Greenfield deinking mill in France, one of Europe's leading mills for the production of high-quality, wood-free deinked pulp. Approximately 20 tons of HP Indigo prints, comprising various ink coverages and types of paper, were collected from HP Indigo Israel R&D and manufacturing operations and shipped to France for the trial. These prints were mixed into the Arjowiggins Greenfield standard paper waste mixture at a level of 5%. The results of the trial showed that high-quality, wood-free market pulp could be produced with 5% HP Indigo prints in the incoming paper waste stream. "The mill trial, using standard Greenfield Mill process conditions, achieved saleable high quality deinked pulp suitable for coated or uncoated paper production [and] mill process efficiencies were unaffected," said Andrew Findlay, Research and Development Director at Arjowiggins Graphic.

For additional information - youtu.be/AVm4SfGUW6k

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Additional information on HP Indigo ElectroInk

For more information visit the HP Indigo web portal at hp.com/go/graphic-arts. Material safety data sheets can be found at hp.com/us/en/hp-information/environment/msds-specs.html.

Performance data presented in this document represent results obtained using specific press models, workflow versions, applications, media types, and other variable testing components. Variations in performance may be expected when tests are carried out using different components. Users are therefore encouraged to perform their own tests under conditions typical of their own printing process and usage conditions.

Note: This document is relevant to the following presses:

HP Indigo 12000 Digital Press, HP Indigo 12000HD, HP Indigo 10000 Digital Press, HP Indigo 7900 Digital Press, HP Indigo 7800 Digital Press, HP Indigo 7600 Digital Press, HP Indigo 7500 Digital Press, HP Indigo W7250 Digital Press, HP Indigo W7200 Digital Press, HP Indigo 7000 Digital Press, HP Indigo WS6000p Digital Press, HP Indigo 20000 Digital Press, HP Indigo 30000 Digital Press, HP Indigo WS6800p Digital Press, HP Indigo 6900 Digital Press, HP Indigo WS6600 Digital Press, HP Indigo WS6000 Digital Press, HP Indigo 8000 Digital Press, HP Indigo 5900 Digital Press, HP Indigo 5600 Digital Press, HP Indigo press 5500, HP Indigo press 5000, HP Indigo WS4600 Digital Press, HP Indigo press ws4500, HP Indigo press ws4050, HP Indigo press ws4000, HP Indigo 3550 Digital Press, HP Indigo press 3500, HP Indigo press w3250, HP Indigo press w3050, HP Indigo press 3000, and HP Indigo press w3200.

North America

Hewlett-Packard Company
5555 Windward Pkwy
Alpharetta, GA 30004
USA
Tel: +1 800 289 5986

Asia Pacific

Hewlett-Packard Company
138 Depot Road
Singapore 109683
Tel: +65 6727 0777
Fax: +65 6276 3160

Europe, Middle East, and Africa

Hewlett-Packard Española S.L
Cami de Can Graells, 1 – 21
08174 Sant Cugat del Valles
Barcelona
Spain
Tel: +34 902 027 020
Fax: +34 935 82 1 400

Israel

Hewlett-Packard Company
Kiryat Weizmann
P.O. Box 150
Rehovot 76101
Israel
Tel: +972 8 938 1818
Fax: +972 8 938 1338

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