

What is the Best Ink is for Your Industry or Application?

Section 1: Understanding Inkjet Inks

Industrial inks are made up of several components. These components include:

- Resins
- Colorants
- Solvents
- Additives

The resin forms the finished ink film and is the substance that holds or carries the colorant. The resin will provide the actual adhesive for the colorant as well as other properties to protect the printing from abrasions and ultra-violet rays.

The colorant can either be a dye or a pigment. Dyes are transparent. Pigments are opaque.

Solvents enable the resin-pigment mixture to be transferred to the substrate during the actual printing process. The choice of what solvent is used determines the actual drying time of the ink.

Additives are substances that are added to the ink to increase various factors such as flexibility, dot formation, improved flow, and pigment stability to name a few.

Industrial inks are used primarily for inkjet printing equipment and print onto materials such as rubber, paper and metal, cardboard, as well as glass and plastic. Industrial inks are used in a variety of applications such as automotive, electronics, medical and pharmaceutical, packaging, aerospace, food and beverage, paper, lumber, and construction.

The application of industrial inks utilize a variety of technologies that include, film drying or air setting, laser marking, multicomponent coating, thermoplastic or thermoset coatings, and UV or radiation curing. Each is a distinct application technology and requires the use of particular types of ink for the process to work correctly.

Because there are so many variables in the make-up of industrial inks, it is important to seek out the advice and guidance of ink specialists who have a solid expertise in understand which ink is best for a variety of circumstances.

Section 2: Working with an Ink Expert

With all of the variation whether type of ink, material being printing onto or printing conditions, knowing which ink to use requires careful review. Choosing the right ink for a specific industrial application should come from the help of an expert who can provide advice and consultation.

An ink expert will start with determining each factor that is particular to an application in order to determine the appropriate ink for that material, environment, and/or a particular time frame.

Some of the factors the expert will consider include:

- Surface Material also known as Substrate (e.g., metal, plastic, paper, glass, etc.)
- Print Environment (e.g., dusty, humidity, temperature, etc.)
- Time Requirements for Ink Drying (e.g., How quickly does the printed ink come in contact with something that could smudge it, etc.)
- Durability of the Code (e.g., will the code be scanned, etc.)
- Industry Standards (e.g., ISO, regulatory, safety, etc.)

Determining each of these factors allow an ink expert to determine which ink is best suited for a particular application or process.

Surface Material or Substrate

So many factors go into the determination of the best ink for various substrates. In most cases paper stock as well as cardboard can handle most inks, but the variations begin to change when you introduce different plastics, metals, or even glass. In addition, the surface area of each of these can make a difference in ink selection as well. Some examples include frosted glass versus clear glass or the fact that some metal services have a microscopically thin layer of lubricant from other manufacturing processes that can affect the adherence of inks.

Print Environment

The location or environment where printing is taking place is a significant factor in how an ink will adhere and perform. Some of the elements that should be considered as part of the printing environment include:

- Moisture
- Temperature
- Humidity

- Dust

It's important to note that these elements don't necessarily rule out a wide range of inks, but they do come into play with selecting the right ink that will be best for each situation. The printing environment affects the ability for the ink to adhere and dry to the substrate.

Time Requirements for Ink Drying

The next factor that is important for ink selection is the time requirements for the ink to dry. The actual speed of drying has to be determined and quantified in order to find the right ink for the application. The most important data point will be how much time is needed between the printing of the code and when it first touches something – additional packaging, an employee's hand, or a conveyor belt. Typically it is a 2 to 5 second period of time between the printing and contact with another surface. Drying time is critical for strong ink adherence.

Durability of the Code

The marking or code that the ink makes must be of a durable nature. After it is printed and has dried, it will have to survive a variety of situations such as weather extremes such as rain and sunlight. It will need to withstand exposure to chemical soakings and abrasive situations. An ink that survives the life of the product is also necessary. This trend of "cradle-to-grave" codes requires that the ink will remain on the product from start to finish. Other aspects that an ink expert will inquire about are whether the ink has to be removable at some point in the life cycle of the substrate. Good examples of this are glass bottles. When they are recycled any marks or codes have to be removed, so an ink must be durable, but also have properties that will break down in a situation similar to the recycled bottle example.

Industry Standards

One of the final factors that is very important are the standards that are required by various regulatory bodies. These could include safety and health related restrictions. More than likely these standards are related to the ink solvents and how they may affect the environment, health of the consumer, or whether they might be flammable. In addition, ISO 14001 certified companies have to adhere to ways that they can cut waste, save on energy consumption, and reduce an ink's impact on the environment.

Customization

As we've discussed above, an ink expert can suggest appropriate inks for a specific substrate and application. They can help narrow down the choices to two or three, thus saving time and effort. Experts can also advise about the right production environment

conditions as in temperature, humidity, and moisture, which affect ink code adhesion and durability. Ink drying and curing times need to be thoroughly understood while selecting an ink.

In addition, an expert can guide on customizing an ink for a particular application. Customized inks can be fabricated to meet specific requirements of customers, e.g., inks with unique properties such as the following:

- Fast setting
- Food grade
- Hard drying
- High contrast
- UV readable
- Oil penetrating
- Heat/steam cure
- Light/fade resistant
- Invisible fluorescing
- Higher light fastness
- Increased rub resistance
- Resistance to heat and soap
- Non-transfer/high temperature resistant

Industrial Ink can be found almost anywhere -- ThomasNet to re-design graphic for this white paper (see below)



Section 3: Innovative Ink Chemistry

PrintJet Inks

PrintJet is a company that provides quality ink and equipment, thanks to its innovative ink technology. Ink solutions cover a wide range of unique requirements including:

- Food grade
- Fast dry
- Heat cure
- High contrast
- Oil penetrating
- Light or fade resistant
- Solvent/chemical resistant
- High temperature resistant
- Condensation resistant
- Retort and thermochromic
- Invisible fluorescing UV readable

PrintJet Advantages

Alternative Inks for Printers

PrintJet offers alternative inks under three broad divisions - continuous ink jet (CIJ) inks, drop on demand (D.O.D.) inks, and high resolution (Hi-Res) inks.

These inks undergo a four-stage filtration process to ensure that there is no sediment, sludge or residue, thus providing a neat finish on all printing assignments. The superior quality of these inks ensures minimal head maintenance and downtime. These inks possess fast drying times of within 100 ms to 2s based on the substrate. They can be smoothly adapted to OEM printers.

Continuous Ink Jet (CIJ) Inks

PrintJet's alternative CIJ inks and makeup fluids are designed specifically for printers such as VideoJet®, Domino®, Linx®, Willett®, Imaje®, and Citronix®.

PrintJet offers the following options in CIJ inks:

- General purpose M.E.K. black inks
- Pigmented inks and returnable glass inks

- Colored micro-pigmented inks for standard coders
- Dye-based colored inks
- Washable inks for special applications
- Drop-in replacement inks

Drop on Demand (D.O.D.) Inks

PrintJet’s alternative D.O.D. inks suit various printing technologies including Videojet®, Domino®, Willett®, Loveshaw®, Matthews®, Diagraph®, Markem® and Foxjet® coders.

PrintJet’s D.O.D ink choices include stock water-based standard inks, high contrast black inks, and alcohol or M.E.K. based inks in blue, brown, red, yellow and green colors.

High Resolution (Hi-Res) Inks

Alternative Hi-Res inks and makeup fluids from PrintJet can be adapted to printers from Videojet®, Domino®, Markem®, Matthews®, Diagraph® and Foxjet® coders. They are designed to be compatible to OEM printers using the Trident® or Xaar® piezo printheads and thermaljet printheads.

Hi-Res inks are provided by PrintJet in quick disconnect bottles with adapter or screw in bottles. These inks enable small character printing, barcode scanability, and crisp and clean graphics.

PrintJet Product ID Equipment

PrintJet provides a variety of product ID equipment for all applications. Table 4 elaborates on PrintJet coders and their key features.

PrintJet product ID equipment for multi-purpose use

CIJ Coders	Hi-Res Coders	D.O.D. Coders	Thermaljet Coders
Variable information	Variable barcode capabilities	Versatile dot sizes	Thermaljet cartridges
Logos	Alpha-numeric printing	Variable character widths	Easy installation
Alpha-numeric codes	Porous or non porous packaging	Print delay control	Easy operation
Date and time codes	No ink spreading or fading	Date and time coding	Economical

Large selection of inks for different Substrates	Economic alternative	Alpha-numeric codes	Low cost consumables
-	Labels or pre-printed boxes	Serial or lot numbers	For porous carton printing
-	Optional print head heights	-	-
-	4-color carton printing	-	-

Sources

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