
WHITE PAPER
Introduction

Printing is a process wherein texts or images are mass produced using a master template. The methods of this can vary in many forms and levels of complexity. Today, printing is a global industry that has use in numerous applications and a variety of consumer products, such as clothing apparel, books, packaging, documents, labels, and more.

Within printing production, there are additional sub-processes to maintain and support the printing process, such as maintenance and cleaning of printing presses.

The following white paper will provide an overview of printing technology with a focus on flexographic printing, the cleaning applications to maintain and support printing, factors in selection of the right cleaning product, and the health and safety aspect of printing maintenance and cleaning applications.
Flexographic Printing Technology

There are a variety of Printing Technologies available today and these can be separated into conventional and digital technologies. All processes for printing have both an image area and a non-image area. The former being that which is printed and the latter being what is not printed.

Conventional Printing Technologies consist of four different types of processes: Planographic, Relief, Intaglio, and Porous. These processes have specific and unique ways in which they separate the image area from the non-image area.

Flexographic Printing is a variation on Relief-style of printing where the plates are usually made of photopolymers. The birth of Flexographic Printing occurred in the 1940’s when the Food and Drug Administration outlawed the use of aniline dyes in food packaging. The food packaging industry re-branded the aniline printing process with new and safe inks and created the term, “flexographic”, as the new name for the process.

Since the 1990’s, the quality of flexographic printing has made substantial advancements and great improvements within the industry. Major improvements to photopolymer printing plates enabled these advancements, as well as other technologies such as ceramic anilox rolls and more.

These advancements and developments propelled flexographic printing with improved efficiency, quality, and speed making this process an ideal method for many consumer products, especially within the food and beverage industries.

Different types of flexographic printing work for different applications and these include Narrow Web (often used for Labels), Mid Web, Wide Web (often used for Multi-Wall Bags) and Corrugated (often used for Boxes).

One of the benefits of flexographic printing is its ability to work with a wide range of various substrates. These include substrates such as paper, cardboard, metallic surfaces, fabrics (non-woven), plastic film, and composites.

Because of its wide and diverse usage with a variety of substrates, flexographic printing is used in a variety of commercial products such as labels, food packaging, plastic bags, and more.

In addition to offering flexibility in use case, flexographic printing also offers flexibility in the inks and digital coatings that are available for use. Whether solvent-based or aqueous, a variety of digital coatings and inks are used with great success and high-quality results, including extremely high color accuracy.

The quality of results combined with the speed and efficiency, makes flexography a top choice for printing needs within the food and beverage industry, cosmetics, and other consumer packaged goods.
An important consideration with flexographic printing is the type of digital coating and ink that is used in the process. Based on the substrate and image carrier, the type of ink will make a difference in the result, so it is wise to select the best ink for the job. How does one make the appropriate selection?

There are several factors to consider when making the selection and two of the most important of these is surface tension and substrate. Making sure to have the proper surface tension will make for a wet out that is full, even, and optimal.

The type of substrate is the other main factor in selecting a digital coating and/or ink for the job. Different examples of substrates that are used include:

- Paper
- Plastic
- Corrugated cardboard
- Laminates

In addition to surface tension and substrate, there are other considerations to make in ink selection that will lead to greater quality results. Some of these are the following:

- Print speed
- Final product
- Compliance of regulations

At the most basic level, however, surface tension is the number one consideration for ink choice. Inks and digital coatings are drawn toward higher surface energy so they should have lowest dyne level, while the substrate holds the highest dyne level and the printing surface in the middle.

There are four main types of inks and digital coatings available for flexographic printing. These are aqueous, solvent based, UV & electron beam, and oil based. As we mentioned, each of these have their use and purpose in a preferred application.

For example, aqueous based coatings are best for corrugated packaging while solvent based is preferred for plastic and film substrates. Select the appropriate ink for the substrate to get best results, but in general, any ink could work on any of the substrates.
Cleaning Processes

Whether one is using flexographic printing technologies or another printing method, implementing proper maintenance and cleaning processes are incredibly important steps of the overall procedure that are too often overlooked.

To get the most from the available technology make sure to know and apply cleaning tools and processes properly. Applicable cleaning processes include the following: On-Press Cleaning, Off-Press/Parts Cleaning, Press Frames and Exteriors, and Facility.

On-Press cleaning describes the process in which the machine and parts are cleaned without any need for disassembly or further breakdown of press parts. Ink and other materials are removed from surfaces manually or through automated systems.

Off-Press and Parts cleaning describes the process in which the machine parts are disassembled and broken down to clean components. This type of maintenance is generally completed in post-production hours.

Press Frames and exteriors cleaning is a process to maintain superficial cleanliness of the machine. This includes tasks such as wiping down surfaces using buckets or by handheld spray bottles and keeping the appearance of the press clean and tidy. This serves an equally important purpose of general overall maintenance.

Lastly, facility cleaning is just as important to maintenance as the previously stated processes. This entails cleaning the floors, walls, and other surfaces that encounter ink and other soils involved in the process.
Yellow Magic

Yellow Magic is a non-Hazmat, environmentally safe, water-based cleaner used to clean everything on flexographic presses, related parts, exteriors, and facility. It is one cleaner that handles the whole press and printing process making for speedy clean up and efficient workflow.

As a versatile cleaner that is used for both water-based and UV inks, Yellow Magic also breaks down coatings and varnishes from surfaces such as rubber, plastic, stainless steel alloys, photopolymer plates, cement floors, and even rugs and other cloth materials.

The related parts to flexographic presses that require regular maintenance and cleaning include Anilox Rollers, Hand Proofers, and Photopolymer Plates.

Anilox Rollers have a ceramic coating and it's important to protect this surface from any scratches or dings. The roller cells are also very small, therefore, ink dries quickly, so it is best practice to clean them soon after removal from the press. Additionally, ceramics have a degree of porosity that allow them to be penetrated by liquids. Due to the porous nature of the ceramic coating, cleaners should also be rinsed immediately after cleaning and not allowed to soak on the ceramic coating.

Anilox rolls that have not been cleaned properly and maintained can get plugged with ink and produce a deficient product and inconsistent quality of printing. This can lead to an increased downtime and waste of resources.

The rolls are usually made from steel bases or other composites. Different cleaners will interact with the material that the anilox roll is made from in different ways. Choosing an incorrect chemical to clean an anilox roll can result in corrosion or other damaging effects so take care in selecting an appropriate cleaner whose contents will interact safely with the roll.

Photopolymer plates are integral to the printing process and require proper and timely cleaning for maintenance and longevity. If they are not thoroughly cleaned, new ink or other substrates will not be able to adhere to the image area.

Ink dries very quickly so cleaning plates is time sensitive. The longer the wait time to clean after printing ceases, the more difficult the rest of the process is. It's important to choose a cleaner like Yellow Magic that is safe and effective on Photopolymer Plates. There are several chemicals that should never be used to clean a photopolymer plate, or it will cause damage, and these include acetone, isopropyl alcohol, and ethyl acetate.

Its many applications within the cleaning process make Yellow Magic very simple and easy to use. It is recommended that users pre-test Yellow Magic on surfaces prior to application.
As described above, it is best practice to clean parts immediately after the completion of each job run on the press and for best results, Yellow Magic should also be used in this manner. As a multipurpose non-toxic cleaner, it can be used in a variety of ways, such as directly on-press, off-press, exteriors, as well as any other surface where unwanted ink or coating might reside.

In general, press part cleanliness will improve and sustain the quality of each printing job run on press. Pick the right cleaner that works for the press and parts. With the understanding of the importance of print quality for any business, Yellow Magic works effectively and efficiently, aiding in the press’ ability to achieve high quality output, while also reducing a press’ downtime between jobs.

For Commercial Flexographic Printers who are producing labeling and packaging for the Food Industry, Yellow Magic 7 is a great choice because it is registered with the NSF (National Sanitation Foundation) and recognized as a safe, non-toxic cleaner for indirect food contact cleaning.

Because Yellow Magic 7 cleaner is non-Hazmat, it can be disposed as ordinary garbage. Simply use a 50-micron screen to filter any contaminants from Yellow Magic 7 before disposing in the trash as normal.

In application, Yellow Magic can be used with a spray and wipe technique to wipe down surfaces or by utilizing it in a Parts Washer.

For spray and wipe application, operator should apply a liberal amount of Yellow Magic directly onto the surface where the ink and coating that is to be removed reside. Wait and allow for sufficient contact time, a suggested minimum of 30 seconds.

Then, use a disposable towel to wipe the ink and coating off the surface. Prior to wiping with disposable towel, operator can also use a safe and appropriate brush, if desired and available, to agitate the ink loose for easier wipe down. Finish the cleaning process by rinsing the now clean surface with potable water.

For use in a Parts Washer, operator should first confirm that Yellow Magic 7 product is compatible with the selected Parts Washer, e.g., ultra-sonic cleaner. Specifications are as follows:

- Yellow Magic 7 flashes at 100° Celsius (212° Fahrenheit).
- The duration of the cleaning cycle and agitation provided will only enhance Yellow Magic 7’s performance.
- Assure there is a final rinse with potable water.

If Yellow Magic 7 is compatible based on the specifications detailed above, proceed with use in a Parts Washer by following the specific manufacturer’s guidelines.
In finding the right product for use in printing applications, some factors to consider are the soil being removed, the material compatibility of cleaner with parts, equipment, and surfaces, the use of a product within the workflow process, and lastly, cost. Cost is not only evaluated based on the cost of the product, but also cost evaluated by product efficiency and more. Selecting a product with these in mind will facilitate better selection of the right product for the business.

Environmental, Health, & Safety Concerns

In the printing industry, there is always a consideration for environmental, health, and safety concerns. This includes Worker Safety, risk of Fire & Explosion, and consideration of Air Quality. Yellow Magic 7 answers these concerns by being non-toxic, non-flammable, and environmentally safe.
Cleaning and maintenance are crucial parts of the workflow process for industrial printing. Regular cleaning and maintenance of a printing press and related parts can maintain and improve printing quality standards, the definitive goal for all businesses in the industry.

Given the importance and unavoidable nature of cleaning and maintenance, selecting the right product to handle these needs is a decision that makes a significant difference in process and workflow improvement. For example, choosing a product that can handle multiple aspects of cleaning and maintenance, such as cleaning on-press, off-press, exteriors, and floors and surfaces in the environment, can reduce the press’s downtime between jobs.

There are additional factors to consider when planning such as the soil that is being cleaned, product compatibility, and cost, as well as environmental, health, and safety concerns.

Yellow Magic 7 is a safe and effective multipurpose cleaner for use in cleaning flexographic presses and related parts, as well as a great choice as a sustainable and environmentally friendly product that is also safe for employees.