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SHELF LIFE OF INKS IN UNSEALED CONTAINERS

Customers often want to know, how long they can store an ink after opening the container for the first time.

Provided ink containers are stored properly we can guarantee processing properties of our inks until the expiration date on the containers. This is different though for ink containers customers have already opened.

It is not possible to give a general answer regarding shelf-life of inks in unsealed containers. The reasons why are explained below.



*Separation**

Definition of Shelf Life

Everything ages. In addition to wear and tear there may also be changes within materials themselves. Most metals for instance show signs of corrosion. As time passes many polymer materials like coatings and inks also experience property changes. Shelf life defines the period of time a material or thing will remain in a state suitable for the originally intended purpose. Thus the term shelf life is also defined by the requirements a material has to meet.

Printers do expect that a certain type of printing ink will show reproducible results. Naturally this can only be expected on the provision that the other conditions remain unchanged as well. Are the prints applied on the same substrate? Are the adjustments of the printing equipment the same? In these cases the best possible exact reproduction can be achieved using a newly opened original ink container. Most difficult applications are only printed this way - unsealed containers are not used. Any inks left over after printing the order or at the end of a shift are disposed of. These aspects are not of great significance in technical screen applications with their standardized processes.

For less difficult processes this may be considered to be a waste of material and therefore inks in unsealed containers are used up. Shelf life of opened containers can be improved

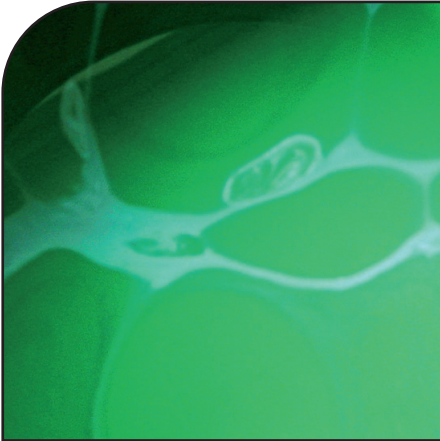
by tightly re-closing the containers immediately after use, and storing the containers in a cool environment. Also never put left-over inks back into the original container, it is better to store them in separate containers.

Inks stored in unsealed containers can be used as long as the resulting prints show the required results. Unfortunately it is not possible to determine an exact expiration date for opened ink containers. This is a matter of individual experience.

Aging is a continuous process. Properties of a printing ink are surely no different one day before and one day after the expiration date. As manufacturer, however, we have to determine a period of time from the date of filling during which we guarantee the properties of our goods. Here we can only assume controlled conditions in unopened original containers, all influences after opening are beyond our direct control.

Influences in storage are either reversible or not. During storage you may experience a non-homogenous distribution of ink components such as settlement of pigments, floating of additives on the surface etc. Such changes are reversible and can easily be reversed by thoroughly stirring the ink before use.





*Floating of white pigment in a mixed ink**

Thorough stirring of inks before use is mainly recommended to obtain the defined original rheology. Generally screen printing inks thin by shearing, meaning that the viscosity is reduced by shearing powers like those triggered by stirring. Often a loose structure is destroyed which will rebuild itself again over longer periods of time. Experts call this phenomenon the thixotropic property.

In order to obtain reproducible results a printing ink has to be in its predefined state.

Inks which have thickened due to solvent loss by evaporation can be thinned with suitable additives. However, after thinning the ink will no longer be in its original delivery state. This is no problem for printers as long as they use suitable and recommended thinners.

Most UV curing inks do not contain any evaporating substances. UV thinners are only used to adjust inks to optimal printing viscosity. However, UV inks are reactive systems which may polymerize prematurely under unfavourable conditions. Clear UV-varnishes often may already skin on the surface due to light scattered by regular daylight. UV inks which have unintentionally gelled also are no longer in their original state. Even though you have no solvent evaporation UV ink containers must be resealed tightly after opening.

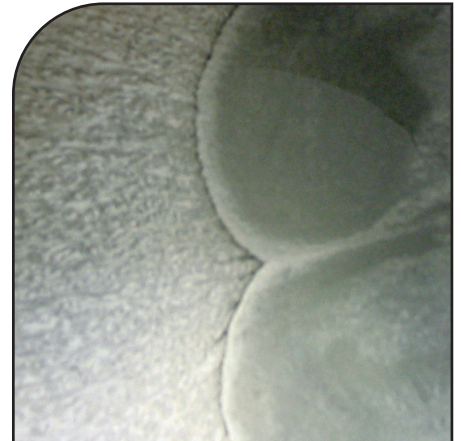
Can Inks Still Be Used After Their Expiration Date?

Usually our solvent based screen printing inks have a shelf life of 5 years. UV-curing inks can generally be stored for 1 year. Naturally there are also exceptions. Always refer to the information given on our labels. We have checked 20 year old solvent based inks in unopened cans and after thorough stirring the inks were still ok. Some UV-curing inks can still be processed after 3 years. Still we do not recommend to process inks which are beyond their expiration date. Printers will process such inks at their own risk, without any manufacturer's liability. Some old inks may also contain substances which are - according to recent regulations - no longer wanted or allowed. For instance 5 years ago, phthalates were still used in varnishes and coatings - today they are banned in most applications. Recently manufactured inks will always correspond to present stipulations and regulations.

*Flooding of particles with lower specific weight**



**Will not show in the printed image after homogenization/stirring*



*Bénard cells (metallic ink)**

Adjusting Inks by Addition of Auxiliary Agents

Our product data sheets contain a lot of information about combinations of the inks with various additives. This information is based on many years of experience. However, we cannot consider all possible circumstances. Actually experiences of the printers themselves are also very valuable. If in doubt only prepare as much ink as you really need for a print job.

A general reply to the question how long an ink will remain stable in a container which has already been opened would be: as long as your prints will have the requested and required properties. However, such an answer is not very helpful.

If in doubt, contact our laboratory and technicians. We will try to find a suitable answer tailor-made to your special needs. In screen technology you will often find that there are no general answers. But that again is the reason why our work is always so interesting!

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