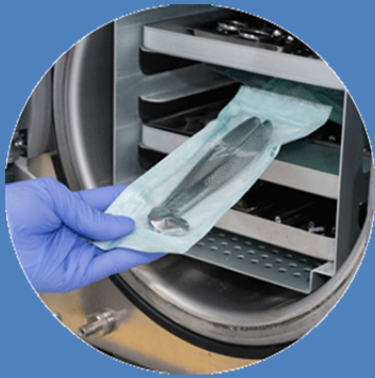


## Printing Tempilinks™



Tempilinks are used in producing Chemical Indicators for sterilization and security applications. Due to the special performance requirements of the inks, although they may look like standard printing inks, they are not. This document provides introductory guidelines to successfully print Tempilinks. For more specific information, please contact your LA-CO Industries, Tempilink representative.

These guidelines are grouped in three sections:

1. Preparing Tempilink to print
2. Printing Tempilink
3. Optimizing your Tempilink experience


Through understanding these guidelines and matching them to your process, you will learn that Tempilinks are just as easy to print as other conventional printing inks. They are just different, and that difference is why they meet the high levels of specialty performance they are known for.

*Note: Tempilinks are primarily used in flexographic printing, although they are also being successfully used in gravure and screen-printing processes. The instructions below are mostly general. Any specifics will refer to flexographic applications.*

## Preparing Tempilink to Print

Tempilinks are designed to exhibit specific visual performance under specific conditions. To achieve these properties, they are formulated with specialty chemicals, and have higher solids content than typical flexographic, gravure, or screen printing inks. Because of the higher amount of solids, thorough mixing is critically important to prepare the ink for printing. Even if a Tempilink visibly appears “good”, it is important to mix it.


Each Tempilink has a Technical Data Sheet (TDS), which outlines the specific time recommended for mixing. Always refer to the TDS for mixing times for the specific Tempilink you are preparing. When preparing a Tempilink use the following guidelines:

ACTIVITY	RECOMMENDATION
Preparing Ink for Mixing	Bring ink to room temperature of the printing press room prior to mixing
Mixing Tempilink	<p>Thoroughly mix the ink, using a mechanical method such as a variable speed, mechanical drill with a dispersion blade. This helps ensure the ink is fully homogeneous and that all solids are incorporated in the solution. Do not mix the ink too fast - this may create foam, and cause problems during printing.</p>  <p>When using a 2-part Tempilink, it is important to thoroughly mix each part separately, following the instructions on the Technical Data sheet. Once both parts are mixed, thoroughly blend and mix them together, again, following the instructions on the Technical Data sheet.</p> <p><i>Note: To check that the ink is completely homogenous use a wooden stick or spatula to make sure that no ink solids remain on the bottom of the container. Failure to properly mix the ink may result in poor or inconsistent print quality and signaling.</i></p>
Thinning Tempilink	<p>If thinning the ink to a desired viscosity, reference the TDS for a recommended thinner. Thinners may be added for adjusting viscosity up to 5% at a time</p> <p><i>Note: Thinning the ink may impact functionality - Confirm initial and signal colors with each thinner addition</i></p>

<p>Avoiding other additives</p>	<p>Do not mix in any non-recommended additives to the ink as they may interfere with the chemical reaction that causes the color change. This may result in a changed signal color, change in the time for the signal reaction to take place, or even stop the signal completely.</p>
<p>Selecting the right Anilox</p>	<p>Tempilinks typically recommend a 100 lines/inch (40 lines/cm) anilox. Please run trials to determine what anilox size works best to achieve your desired end result.  <i>Note: Reference the TDS for the Tempilink you are using for more information.</i></p>
<p>Preparing the Press to Print</p>	<p>Be sure to wash all cleaning fluid off any area of the printing press that will contact ink; cleaning fluids can cause ink chemistry issues.</p> <p>For Water-based Inks - Wash off cleaning fluids with distilled water or isopropyl alcohol from the areas that may be in contact with the ink to stop any chemical reaction between the cleaning fluid and the Tempilink. Dry thoroughly!</p> <p>For Solvent-based Inks – Wash off cleaning fluids with isopropyl acetate or Isopropyl Alcohol from the areas that may be in contact with the ink to stop any chemical reaction between the cleaning fluid and the Tempilink. Dry thoroughly!</p> <p><i>Note: When cleaning and storing the anilox, always follow the manufacturer's instructions. Anilox may be easily damaged through improper handling, cleaning, or storage. Contact your anilox supplier for more information.</i></p>

## Printing Tempilink

There are similarities between sterilization inks and other graphic printing inks. However, there are differences that impact the ink's performance. For example; to achieve the signal change of the Chemical Indicator, the amount of ink typically required is greater than the ink printed for the same size graphic image.

ACTIVITY	RECOMMENDATION
Preproduction Check	Always run a sterilization test prior to a full print run
Maintaining the ink mix	While ink is in the fountain/ink tray, continuously circulate it to avoid solids depositing on the bottom of the tray – this may be done by hand or with a slow-speed circulation pump.
Monitoring Viscosity	<p>Viscosity should be monitored on a regular basis to ensure the uniformity of the ink throughout the printing run; typically 30 to 60 minute intervals. Using a cup, such as a Zahn, DIN, or Ford Cup, over time you will learn what viscosities work best on your press. Setting up and maintaining viscosity parameters for the specific ink helps in successful repetition of future runs.</p> <div style="text-align: right;">  <p>Example of Zahn cup</p> </div>
Adjusting Viscosity of Solvent-based Inks on the Press	<p>During a print run, if the ink viscosity has increased, adjustments to the ink may be required to maintain proper performance on the press. For solvent-based inks you can add the recommended thinner (see Technical Data Sheet) at small amounts. The initial thinner addition is usually less than 5% of the volume of ink. Once the thinner is thoroughly mixed into the ink the viscosity of the ink should be checked. If the viscosity is still too high, then additional 2-3% increment of thinner should be added. The thinner should be added either to the ink tank or if the ink is only contained within an ink tray, it should be added and mixed by hand to produce a uniform viscosity across the entire tray.</p>
Adjusting Viscosity of Water-based Inks on the Press	<p>During a print run the ink viscosity can increase. If this happens, adjustments may be required to maintain proper performance on the press. The first step in lowering the viscosity of a water-based ink is to check the pH of the ink. If the pH has dropped from the initial pH of the ink at the start of the print run then it should be raised with a 10% / 90% solution of ammonia / distilled water. Add a few drops of the ammonia/distilled water solution to the ink at a time and then check the pH. Repeat this process if the pH has not returned to the proper state. This can be done either in the ink tank or the ink tray. When adding the ammonia/distilled water solution it should be thoroughly mixed into the ink before re-measuring the pH of the ink.</p> <p>Once the ink's pH level is brought back to its initial value, if more viscosity reduction is required, it can be accomplished by adding distilled water. Caution should be taken when adding distilled water because water generally reduces ink viscosity very quickly. Again 1% – 2% additions of distilled water should be made each time and viscosity rechecked after the addition.</p>

Storing remaining ink	<p>At the end of a print run, the ink remaining in the tray and day tank may be stored for future use. It is important to store this ink separate from any ink which has not been run on the printing press. Select a clean container and label the container with all appropriate information (e.g. Ink name and number, batch, manufacture date, etc.)</p> <p>Two-part Tempilinks have shorter shelf lives once mixed and blended together. Use the mixed ink within days and only after confirming the performance is within the set parameters for the application. Be sure to refer to the ink's Technical Data Sheet (TDS) for information on a specific ink.</p> <p><i>Note: Even if an ink has been mixed previously, it is important to mix it again prior to a new print run. Be sure to reference the Technical Data Sheet (TDS) for specific mixing instructions.</i></p>
Cleaning the press	The printing press should be thoroughly cleaned immediately after a print run. This makes preparation for the next print run easier.

## Optimize Your Tempilink Experience

### **Q. My Tempilink is stratified in layers, is something wrong with it?**

A. No, Tempilinks are printing inks, but they can look and behave differently than other printing inks you may use. Due to the high level of solids in the inks, they may settle more than other inks you have worked with. This is normal and does not mean anything is wrong. It does illustrate why mixing these inks is so important. The solids are an important part of the Tempilink chemistry. They facilitate the color change in the correct conditions. Mixing them thoroughly into the solution is necessary to realize that change.



After sitting ink may become stratified

### **Q. I have changed from using one Tempilink to another. My old ink stratified in layers and needed mixing to homogenize the ink. The new ink does not do this and looks homogenized when I open the container. Do I still need to mix it?**

A. Yes! Even though an ink looks like it is well mixed, after sitting, the solids will start to settle. *All Tempilinks must be well mixed prior to use.*

### **Q. Can I dilute the ink?**

A. Great care should be taken before diluting Tempilinks as they contain chemical components that must be present in a sufficient quantity and balance for the chemical indicator to signal properly. When viscosity adjustments are necessary, please refer to Technical Data Sheets for an appropriate solvent.

### **Q. The initial color appears good; however, the end/signaled color is not significantly different. What could be the cause?**

A. The ink mixing in the tray/pan and any circulation system should be checked. If solids in the ink are settling, the signal color will be negatively impacted.

The amount of ink printed on the substrate (coat weight) will affect the shade of the signaled color. If enough ink is not being printed, the print color may still look good, but the signal color will not have a consistent color.

The signal color change will also depend on parameters such as substrate, sterilization conditions, and position within the sterilizer.

Chemical indicators are designed to confirm that an item has been through a sterilization process. If the chemical indicator does not change to its signal color, it is important to confirm the sterilization system is working properly.

### **Q. What is the minimum amount of ink required to give an appropriate signal?**

A. Various classes of inks will require different coating weights for development of the appropriate signal. Different substrates can also impact the signal color. Always test your product at set up and during your run to confirm you are getting the proper print and signal colors.

### **Q. What is required to get a consistent print?**

A. Some good practices include using a clean anilox, proper mixing, and care in selecting the ink most compatible with the substrate.

**Q. Can I use Tempilinks for other printing technologies?**

A. Most Tempilinks are designed for flexographic printing; however, many of our inks are also used with other printing technologies (e.g. gravure, screen printing). Please contact your LA-CO Industries, Tempilink representative for details.

**Q. What can cause the signal-color to vary significantly between substrates when printing the same ink?**

A. If you have used a Tempilink for another application, it is important to test the ink on any new substrate or process and confirm initial print and signal performance. Different substrates can have different results both in the initial and signal colors using the same ink. Just because you have one shade of a color with one substrate does not mean that you will get the same shade with another substrate.

**Q. My printed ink does not signal consistently. In the same print area, some parts signal and others do not; or, in the same roll, some indicators signal well and others do not signal at all. What is wrong with the ink?**

A. Your ink is probably OK. If the signal strength varies within a print run, the most common cause is poor mixing of the ink. When chemical indicator inks are not well mixed, the active ingredients (actives) are not well dispersed throughout the ink. The actives are the materials responsible for the color change under the sterilization conditions. If they are not evenly spread throughout the ink, they cannot evenly signal in the indicator. This is why some of the indicators will have strong signals while others may change partially or not change at all.

**Q. The ink was very well mixed and the initial indicators signaled very well. Part way through the print run, the indicator signal became inconsistent. What happened?**

A. The ink has not retained the homogenous (evenly mixed) state. The most common reason for this is lack of circulation of the ink during printing. This can be fixed in one of two ways;

1. Set up a circulation system for the ink. In this solution, the ink is drawn from the pan into a container which is continuously mixed at a slow speed. Ink is then fed back into the pan for printing. The circulation of the ink helps it remain evenly mixed.

OR

2. Manually stir the ink, with a plastic or wooden stick, in the pan on a regular basis, such as every 10 to 15 minutes. When using this process, it is important to cover the entire pan, making sure ink that has been “trapped” in the edges and corners is also mixed back into the solution.

**Q. The ink has gotten very “foamy” while printing. What is wrong with it?**

A. Some inks will “trap” air more easily than others. This will cause foam. Care needs to be taken during initial mixing and with any automated or manual circulation of the ink during printing, to make sure air is not added to the ink. When mixing, do not mix at a high speed. This may trap air in the ink and cause foaming. The same is true for ink circulation while printing. If the circulation is set to pull out and return ink at too fast a speed, it may trap air and cause foaming. Often, simply slowing down the mixing and circulation speeds will resolve the foaming issue. Another issue in a recirculation system is the drop length of the ink return pipe to the bottom of the container. The distance from the end of the pipe to the bottom of the container should be minimal.

**For Additional Information Contact:**

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