

ADHESIVE PROBLEM SOLVING

Most adhesive problems result from using a good, but otherwise incorrectly chosen adhesive for a particular application. There are a number of common problems:

1. Labels are falling off.
 2. Labels will not remove.
 3. Adhesive is causing problems in the printer.
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1. Labels are falling off. This is largely a function of adhesive choice and/or the type or condition of the surface to which the label is being applied. Some of the common problems are:
 - a. Labels applied to frozen surfaces. If a label is going to be applied to an already frozen surface, a freezer grade adhesive is required. Virtually no standard permanent or standard removable adhesive is designed to adhere to surfaces already frozen at the time of application. This is referred to as "application temperature." Most permanent adhesives applied to a surface that is at normal room temperature, which is then later frozen, should work. This "later temperature is referred to as the "service temperature."
 - b. Labels applied to newly painted metal (shelf/rack applications). Recently painted metal will "gas out" a chemical from the paint. Many of these chemicals can corrode some adhesives, causing the label to fall off.
 - c. Labels applied to newly cleaned surfaces. Good label application calls for a label to be applied to a clean surface. If a surface is to be cleaned prior to label application, allow plenty of time for the cleaned surface to dry. If a label is applied to a recently cleaned surface that still has some lingering residual cleaning agent, that agent will likely erode the adhesive, resulting in the label falling off.
 - d. Labels are removed and reapplied multiple times. Some types of permanent adhesive are "repositionable," meaning that they are capable of being removed within 24 hours and repositioned in a position or location. The longer the lag period the less likely this is possible. If such a label is removed after a few hours and repositioned, its adhesive characteristics may be compromised resulting in poor adhesion.
 - e. Labels are applied to an oily surface. Oily surfaces will prevent adhesion to the intended surface. Some adhesives will work better than others
 - f. Labels are applied to contaminated surfaces. In many instances labels are applied to contaminated or dirty surfaces (i.e. dust or other loose debris). In such cases, the label typically sticks to the "contamination," but the "contamination" does not stick to the intended surface. The only real two choices are either cleaning the intended surface or finding a more aggressive adhesive.
 - g. Labels are applied to a low energy surface. Some surfaces, primarily smooth plastics (i.e. a plastic tote or bin) have such low adhesion characteristics that certain types of adhesives must be used. Further, some chemical characteristics of these plastics are incompatible with certain adhesives.
 - h. Labels are applied to a rough, irregular surface. In some instances, labels are applied to surfaces that are so irregular that there is only a minimal amount of adhesive contact. Softer type adhesives will perform better.

2. Labels will not remove. There are a variety of removable adhesives, all intended for different applications. Some standard removable adhesives will ultimately turn permanent. Removeability will be a function of adhesion duration and the surface to which the label is applied. Heating up the label may soften the adhesive enough to allow removal.

3. The adhesive is causing problems in the printer. This can happen in a variety of printers (i.e. laser, thermal, thermal transfer) for a variety of reasons.

- a. Laser printers. Certain adhesives will ooze out from the edges of the label material or from die cut areas. This ooze can be a very slow build up or develop more quickly depending upon the type of adhesive, the volume of sheets through the printer, and the heat inside the printer. The adhesive will cling to rollers inside the printer. Typically adhesive ooze on the side edges of the label will slowly build up on internal rollers as well as the print drum. As the printer heats up, the accumulating adhesive will soften and become tacky. As subsequent sheets move through the printer, the soft adhesive will stick to those sheets resulting in a paper jamb. The solution is a different adhesive choice and/or a different construction in which the label edge is recessed from the liner edge.
- b. Thermal/Thermal transfer printers. Most thermal/thermal transfer labels are in rolls. Some butt cut labels may have edge ooze similar to that described above in the laser label section. This ooze can build up causing labels to stick in the printer. There can also be ooze from around the die cut edge in rolls that are wound too tightly (squeezing the adhesive). In this situation, the adhesive may actually build up on the print head causing print head damage.

Permanent versus Removable

To determine if an adhesive is permanent or removable, place the label on a piece of plain notebook or copy paper. Wait 5 to 10 minutes and remove the label. If it tears or picks at the paper, it's permanent. If it removes cleanly, it is removable. There are a variety of permanent and removable adhesives.

Another test is to fold one edge of the label and stick the label adhesive to itself. Try to pull it apart. If it sticks, it is permanent. If it removes, it is removable.

For some special applications some permanent adhesives have low initial tack while some removable adhesives have higher initial tack. This can provide misleading results.

Permanent versus Cold Temperature

To determine if an adhesive is standard permanent or cold temperature permanent, place the label on a chilled surface (i.e. something out of the refrigerator like a soda can or a condiment jar) and immediately place it back into the refrigerator. Wait 30 minutes and then remove the jar or can from the refrigerator. If the label is still affixed and somewhat difficult to remove, it is a cold temperature adhesive.

Another clue is how the adhesives perform in a warm or hot environment. A general standard permanent adhesive is designed to perform well in temperatures from approximately 35 degrees F to 275 degrees F. A cold temperature adhesive is designed to perform well at temperatures below 35 degrees F. If a cold temperature adhesive is in a warm setting, it will become less permanent and

“leggy.” If allowed to set in a warmer setting, a label with cold temperature adhesive is more likely to be able to be removed than is a standard permanent adhesive.

Permanent versus Freezer

Repeat the cold temperature process above but use something frozen instead of something cold.

Acrylic versus Rubber

Acrylic and rubber adhesives provide different adhesion characteristics that may be important depending upon the intended application. The following process can help determine if an adhesive is acrylic based or rubber based:

Put a few drops of heptane (or other equivalent aliphatic solvent like lighter fluid or naphtha) on the adhesive side of the label. Citrus-based cleaners for removing adhesives, stickers, gum, tar, grease, etc., may also be used. Let the fluid soak for about 30 seconds, then gently but firmly scrape the adhesive off with the edge of a razor or pocketknife blade (if you want to also identify the label facestock, save it for later analysis).

If the adhesive is very soft, comes off easily, and is slightly straw (yellowish) colored, it is probably rubber based. Look for a creamy texture while scraping the adhesive off. Some rubber-based adhesives have filler in them to make them less oozy. So some may be white when they are removed.

If the adhesive is water clear (may turn whitish as it dries), hard to get off or balls up, then it is probably an acrylic based adhesive. Most acrylics do not dissolve in aliphatic solvents, so the mixture will not be a creamy mixture.

Acrylic adhesives (as well as all rubber based adhesives) dissolve completely in acetone (keep this in mind if this is a security label application). Some emulsion acrylics can be detected by slowly adding water to the acetone-adhesive mixture. If the solution stays clear or unchanged, then it is probably an emulsion acrylic. If the solution turns milky, and something precipitates out, then it is probably a solvent-based (or hot melt) acrylic. This is not a recommended process for one inexperienced in such processes. An experienced technician will yield more accurate results.