

BACK TO THE FUNDAMENTALS

By Kevin Lumberg



Have you ever been watching a sporting event, or a news conference after a sporting event, and heard the coach after a particularly poor performance state, “We had a poor result today, and we need to work on our fundamentals”? The Webster’s Dictionary definition of fundamental is, “Of or relating to the foundation or base. Forming or serving as an essential component of a system or structure.”

Fundamentals in baseball may be a proper batting stance and swing, proper fielding, and throwing. In basketball, fundamentals may be dribbling, passing, and shooting. Sublimation also has fundamentals, and to get the best results, it is very important to know what they are and how they affect your results.

WHAT ARE THE FUNDAMENTALS

The fundamentals of sublimation are **time**, **temperature**, and **pressure**, and all three must be present and correct, to get the best results. Sublimation is defined by dictionary.com as, “A change directly from the solid to the gaseous state without becoming liquid.” A common occurrence of sublimation that most people are familiar with is dry ice. It starts as a solid and as it warms it becomes a gas.



To really understand what the fundamentals of time, temperature, and pressure play in the sublimation process, you need to know what occurs when you sublimate a blank product. First you place the sublimation transfer against the sublimation blank, and place it into the heat press. All sublimation blanks are made of or coated with polymers. Polymers are made up of repeating and linked molecules. When they are heated (temperature), their “pores” open up.

At the same time, the solid sublimation dye particles that were printed onto the sublimation paper turn from a solid to a gas. Since the transfer paper is pressed up against the polymer surface (pressure) the gas can only go straight into the “pores”. When the press is opened (time) the sublimation blank immediately starts to cool, and the “pores” close back up, and the dyes turn back from a gas to a solid, inside the polymer coating.

HEAT THINGS UP

Let’s start with the easiest of the three to explain...temperature. For the most part, products are sublimated at 400 degrees. One thing to remember is that if it is suggested to sublimate something at 400 degrees, you can’t just

increase the temperature to sublimate it quicker. Polymers used in the sublimation products have a melting point higher than 400 degrees, so if you try to increase the temperature, you will melt the product.

There are however, some products available that are sublimated at a lower temperature because the products have a lower heat tolerance. If you decrease your temperature, you need to be aware that you have to increase your time to compensate.

Most heat presses have a temperature gauge of some sort, but it is important to make sure that the temperature gauge is accurate. We have seen many presses off by as much as twenty-five degrees hot or cold from what their digital readout states. To check your press's accuracy you can use a laser thermometer, a thermocouple, or temperature strips.

A laser thermometer works by shooting the laser at the heat platen. Be aware that this type of thermometer will not work correctly on a silver color heat platen, but it works great on a black Teflon coated platen. The thermocouple or temperature strips will work on either platen, are used by making direct contact with the platen. Contact your distributor to find out where to purchase these items.

ON YOUR MARK, GET SET, GO

By **time**, in sublimation, we mean how long you leave a blank product and the sublimation transfer in a heat press. You can count down your time with any timer, but believe us it is much easier if you have a good digital timer on your heat press. Specifically, you should have a timer that automatically starts when the press closes. The length of time that you need to have a product in the heat press depends on the mass or size of the item, and how long it takes to heat that item to 400 degrees.

A small name badge may need to be pressed for approximately 45 seconds, whereas, a six inch ceramic tile may need to be pressed for six minutes. If you press several six inch tiles it would take much longer than that. The time that you press a blank sublimation product will also depend on your heat press.

Different quality and sizes of heat presses will need different press times for the same product. For instance, if you press a twelve inch tile in a small fifteen inch press, when you close the press, the tile quickly sumps the heat out of the heat platen of the press and the temperature of the press quickly lowers. During the press time, the press will slowly recover its heat back to 400 degrees, and this time will affect the total length of time you will need to press the twelve inch tile.

Another point to remember is that the temperature of the tile when you first put it into the press will affect how long it will take to reach 400 degrees. The room temperature where you store your tiles may be significantly different than ours. That is why pressing instructions generally will have a time "range" for pressing sublimation products.



THE PRESSURE IS ON

Pressure in sublimation, is how hard the heat platen closes onto the sublimation transfer and the blank sublimation product. Out of the three fundamentals, this is the one that accuracy is least imperative. Don't get us wrong, it is still important, especially on some substrates which we will cover shortly, but you generally don't have to be exact.

Most sublimation products are pressed with either light or moderate pressure. The question we most often get is, "is how does a person know what light, moderate, or heavy pressure is?" A good tip to determine light pressure is to close a dollar bill halfway into the press. You should just be able to pull out the dollar bill without ripping it. That will be light pressure. Once you have done that, get a good feel for the pressure by opening and closing the press several times. You should be able to recognize it well enough to readjust it again when you need to.

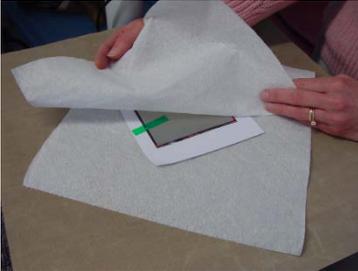
For heavy pressure, you will have to work fairly hard to get the press to close. Moderate pressure will be right in the middle. Again, get a good feel for the pressures, so you can repeat them when needed.

Two products that are very touchy on pressure are apparel and non-Unisub metals. For apparel, very light pressure is required, and there is a product available to help you achieve that. It is Vapor Foam which is a soft foam material that is laid between the shirt and the bottom platen of the heat press. It allows you to have a consistent light pressure on the transfer to the shirt. If you press a shirt without the foam, you will get a good image, but you will get press mark creases where the edge of the press hits the shirt, and also where the edges of the transfer paper is pressed between the heat platen and the fabric.

Polyester has a very high "memory" for creases. That is why permanent press garments are made with polyester content in the fabric. The creases on your sublimated shirt won't come out when washed, but the good news is that you can press sublimation shirts with the Vapor foam and not have any press marks at all.

The second material that is very touchy when it comes to pressure is non-Unisub metal. Unisub metal has a very hard coating with a very high melting point that presses very easily, and without problems, but other metals available for sublimation have softer coatings. If you press non-Unisub metal with too much pressure, you will press the paper grain into the soft coating, removing the glossiness.

The best way to explain the resulting look of your metal plate is that it has a “water mark” look to it. You cannot fix your metal plate, as the coating has been physically changed. The good news is that you can sublimate this metal and get wonderful results, if you apply the fundamentals of sublimation, and use light pressure.



To do this, first place a piece of fluffy white paper towel on the bottom of your press. Next, place your transfer face up, and place the metal onto the transfer face down. Place a second paper towel on top of the metal. You should then press your metal for about 45 seconds at 400 degrees with light pressure. The paper towel will help keep consistent even pressure on the metal and transfer paper, without allowing too much pressure. You will get great quality metal this way.

YOU NEED ALL THREE

You can get great looking sublimation results, but you must be aware of your three basic fundamentals when you are pressing your products. All three, time, temperature, and pressure must be used properly, or you will have no consistency. Make notes for each of the products that you sublimate. If you are consistent with your fundamentals, you will be consistent with great looking sublimated products.