Heat Seal Kite Making

Need for technique Using a garbage bag is a very economical way to create a kite. If the proper design is used, the kite can be quite attractive, especially in the sky, where nobody can distinguish what the kite is made of unless you tell them. One big problem, however, is that no tape is permanent. Some tapes work better than others--I find book mending tape to be the best--but in time they all peel off. If you fly the kite near or on a beach, grains of sand can get into the area between the kite surface and the tape, and the sand makes the tape even less adhesive, making this problem worse. One way out of this is to use a heat sealing method. Many years ago, I was shown this process by the former AKA president, the late Jack Van Gilder, who used a simple soldering iron at Fort Worden. After exchanging many letters with him, about the control of the heat, I tried changing the temperature, infinite switches, etc. The best result was obtained with the use of a dimmer switch. This process is basically the same as making commercial poly bags.

Tools

Soldering Iron 15W to 50W, not necessarily fancy or large capacity, they all work the same way. There are two types, one with a screw in tip, the other with a solid rod and a side screw to hold it in position. The latter is better suited for our purpose.
Spare tips and several inches of 1/2" copper tube for plumbing (2 to 3" long 5/8" O.D. tubing)
Dimmer switch
Timer (this is an option.)
Wax paper
Straight edge (Formica or Arborite) 1/8" thick 2-3" wide; metal straight edges, especially aluminum, are not suitable because they conduct heat too well.
Cutting surface (cardboard, glass, etc.) to protect desktop.
Bonding surface (cardboard, stack of newspaper) to protect desktop.

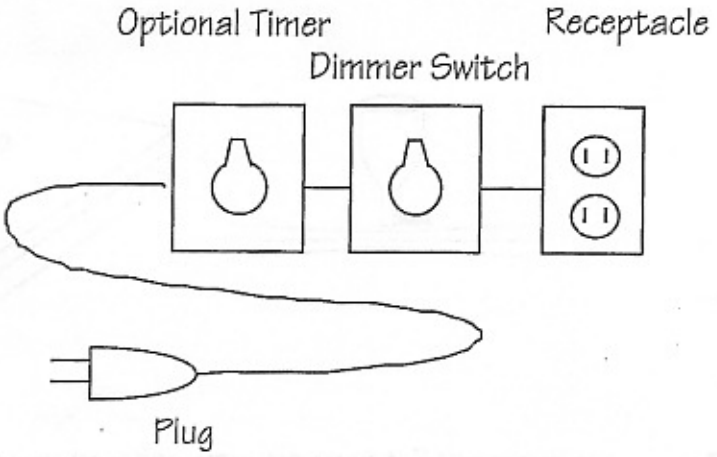
Material

High-density polyethylene, trash bags or some garbage bags work well. Some garbage bags are made of low-density polyethylene, but they can be just as useful. The temperature required for heat sealing is much different from that of high-density, so it would need to be adjusted. They can be mixed.
Small piece of **Tyvek**.
Polyethylene tubes and rings.
Wooden dowels, suitable size.

Wiring Required

The soldering iron must be adjusted to a proper temperature so the electricity must be controlled by a dimmer switch and if you want, you

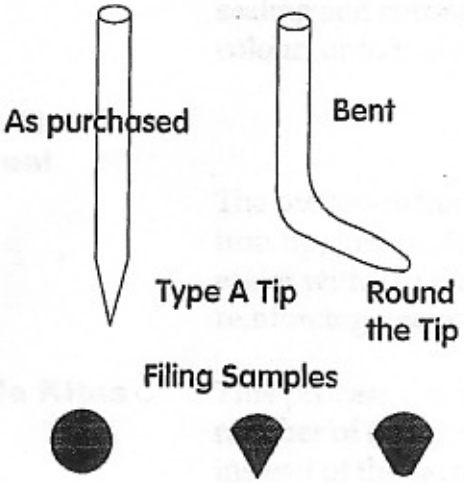
can add a timer for safety reasons. This is very simple wiring, but if you are not familiar with wiring, just ask someone who is.

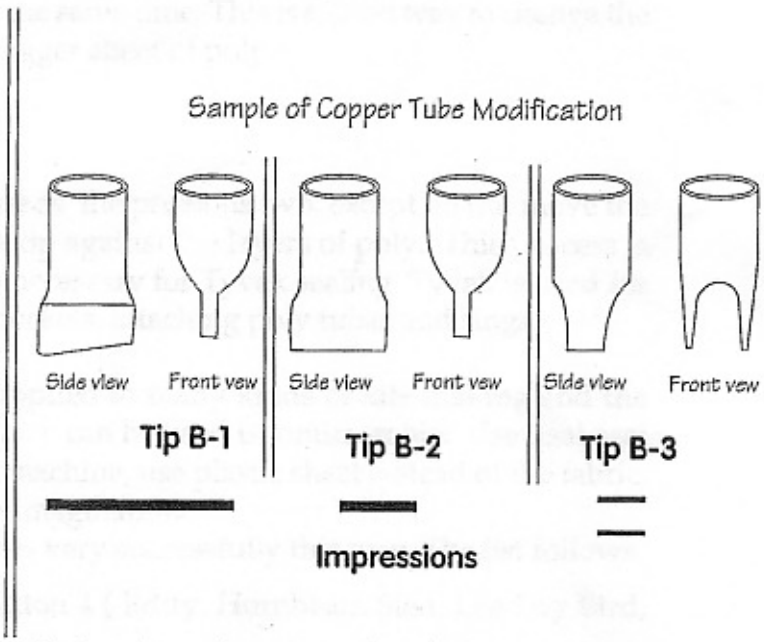


Tip Modification

In order to use the soldering iron with more ease, the tip must be modified. Just bend it to a 60 degree angle and if you want, you can file it to suit your job. (Tip A)

For the second kind of tips (Tip B), use copper tubing, usually used for plumbing, cut it to 2" long, then flatten one end using a vise or a hammer. Dress the tip with a file and drill a hole on each side suitable to hold the screw of the soldering iron.

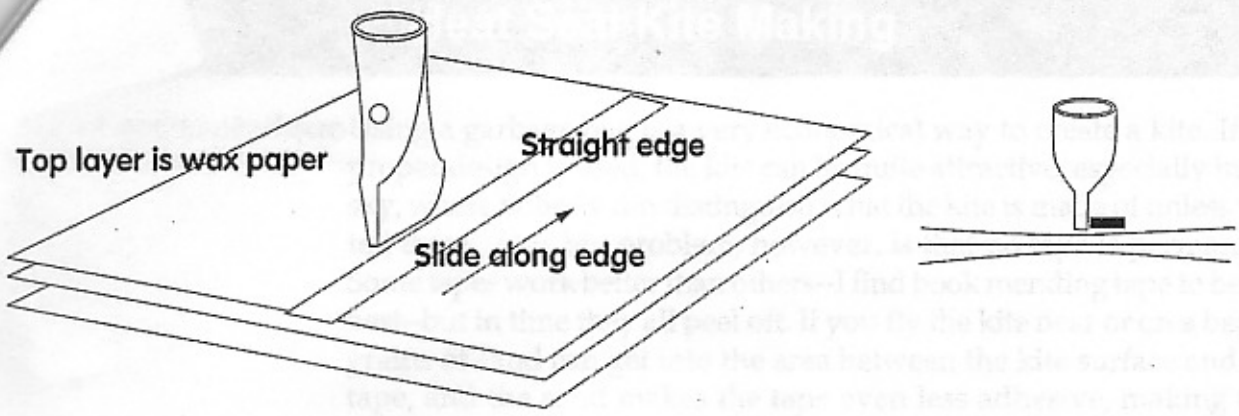




Basic Practice

Practice I
Heat seal

Lay one layer of high-density poly on top of another and cover both with wax paper. Slide the soldering iron along a straight edge. Wait until it cools, then take a look. Take it apart, and test it for strength. If the temperature is right, the seal should be strong enough. If the temperature is too high, or the iron is moved too slowly, the poly may melt, and come apart. If the temperature is too low or the iron is moved too quickly, the poly will not seal together. Practice more, adjusting the temperature until you get the right results. Sometimes, when the sealing is done correctly, you can see the texture change to become



slightly translucent. As you practice, you can soon tell the result by just looking at it.

Practice II
Fuse cut

This process cuts two or three sheets of high-density poly at once, and thus fuses them together.
Arrange two or three layers of high-density poly and cover them with wax paper. Repeat the procedure in Practice I, making the iron hotter than in the previous process. The poly should be melted through, sealing and cutting at the same time. This is a good way to change the colour, or to make a bigger sheet of poly.

Practice III
Push seal

The process is the same as the previous two, except do not move the iron tip, just push the tip against the layers of poly. This process is easier with Tip B and necessary for Tyvek sealing. Tyvek is used for reinforcing, making pockets, attaching poly tubes and rings.

Suitable Kites

This process can be applied to many kinds of kite making and the number of designs which can be used is innumerable. Use heat seal instead of the sawing machine, use plastic sheet instead of the fabric. The only limit is your imagination.
I have made many kites very successfully this way. The list follows:

All the kites in Section 4 (Eddy, Hornbeam Sled, Lee Toy Bird, Invader)
All kites in **Margaret Greger's "Kites for Everyone" and \"More Kites for Everyone"**
Nishi's light wind kites, many kinds
Peter Lynn
Genki
Delta, many different shapes and sizes
Facet kites
Snowflakes

Useful info for heat seal prep by Dan Kurahashi

We need to heat up the plastic above melting point to achieve heat seal.

Various melting points of different types of plastic:
HDPE (High Density Polyethylene : (make crisp rustling noise) is about 130 °C
LDPE (Low Density Polyethylene : (make no noise) is about 110 °C
PET (Polyethylene terphthalate : water bottle) is about 250—260 °C
PP (Polypropylene) is about 160—170 °C
PVC (Polyvinyl Chloride) is about 75—90 °C

Tip **temperature** needs to be 30 °C to 100 °C higher than melting point.

Consider following fact, **right combination** makes seal better, if you fail, change one at time.
Tip temperature
Heat transfer rate, two layers or three layers? Total thickness?
Pressure, more will transfer heat faster, too much tear the face.
Speed if moving, or if stationed length of time. Do not forget to **wait until cool down**.

Typical Thickness

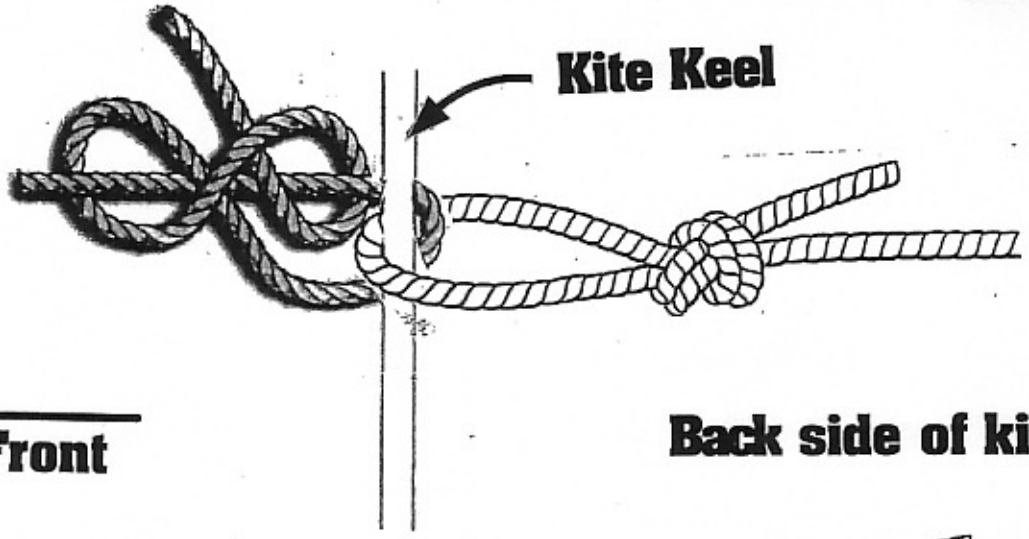
LDPE :
Sandwich bag 0.001" or 0.0254mm (0.001" (one thou) = often called as 1 mil but mil is also lazy way of saying millimeter too so in order to avoid confusion, I only use thou
Plastic sheet 0.001."
Ziplock bags 0.0025" to 0.003"
Heavy plastic 0.004" and 0.006" (available in building supply)

HDPE
Shopping bags 0.0005"
Heavy Duty bags 0.0015"

Compare to
Typical newspaper 0.003"
Copy paper 0.0035"

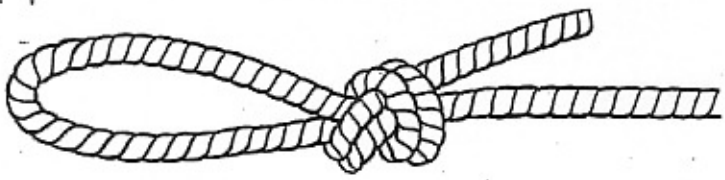
We are using 0.001" skin and 0.006" reinforce for our class 0.006+0.001+0.006=0.013"
Kite skin weight
Lifting surface 128 sq inches (little under one sq foot) Total area 252 sq In

Test sample pc until tear apart. Be sure heat bond is stronger than rest.

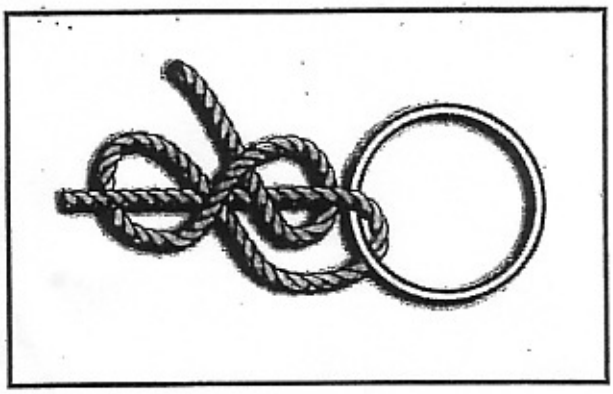


Front

Back side of kite



Runtline Hitch



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DO
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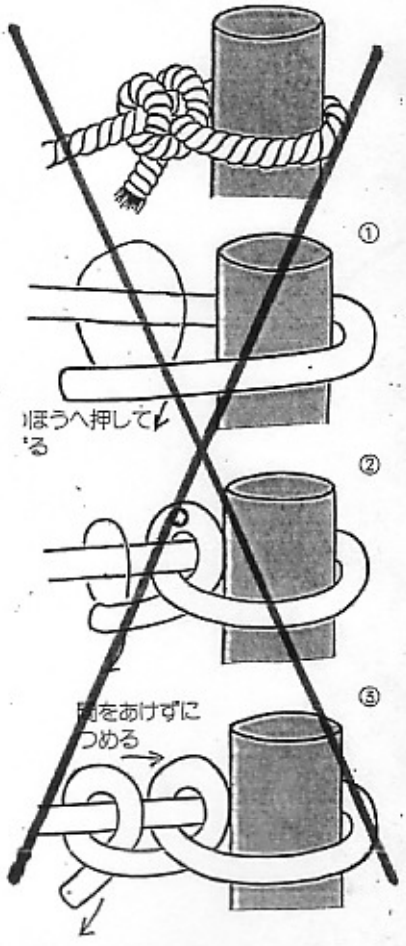

Same knot