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TCC Competition Primers 2007
<http://www.tccnar.org>

In article <c3cb3671.0302111107.cf49229@posting.google.com>, wscarvie@hotmail.com (Will Scarvie) writes:
> So what kind of store would I go to if I wanted to find sheet Mylar
> for making parachutes? Michaels? Home Depot? Some more specific
> industrial supply store? What's this stuff used for other than m.r.
> parachutes? :-)

What size chute? And for what purpose? For competition duration chutes, I use 1/4 mil aluminized Mylar. I know of no common retail sources for the 1/4 mil Mylar. But many of the rocket companies sell this, including IIRC Apogee, ASP, and Pratt. I have a bunch of this that belongs to Alan Jones that is for sale, (roughly 40x60" for \$3, same roll that produced my record setting chute) but I'm not in a position to ship it.

For egglofter altitude and many sport models I use 1/2 mil Mylar instead. It's what The Launch Pad uses for their chutes. I've seen Mylar "party wrap" in 18x30" sheets at the local party stores for about \$0.40 per sheet. Don't know if Michaels or Hobby Lobby or someone like that has this stuff too. I make either one 12" and one 18", or 2 15" chutes out of a sheet. I've tried taping 2 sheets of Party Wrap together to make a 30" chute. It's not ideal but it works.

The 12" chute, with over the top shroud lines, is sufficient for recovery of my Eggloft models; the 18" for Dual Eggloft. Note: I recover my eggloft altitude models in 2 pieces, with the egg capsule on its own chute, and the booster on a streamer. This prevents egg damage from shock cord snap back or banging into each other on the way down. Use a larger chute if you recover both pieces together, and make sure the two pieces can't collide on the way down.

Other than that, the best large sheet Mylar material I've found is the ORIGINAL "Space Emergency Blanket". <http://www.mpioutdoors.com/main.htm> One side is silver, the other side gold-ish orange. I've seen them recently at stores like REI. They come in an orange box and are 56x84". That makes one 56" chute (the size I used on my record setting Eggloft duration flight, except that was quarter mil instead of half mil) and a pair of 28" chutes. Or a pair of 42" chutes and a humungus streamer.

The cheap import stuff that's sold in many discount stores these days may work, but is heavier and stiffer than the original Mylar sheet. IMHO trash bags make as good a chute as the knock-off rescue blankets, for less \$\$\$.

For LMR chutes, I've found Sunline to be a good choice. It's a lining material available at fabric stores, for about \$3 per yard (36" by 60"). For heavier rockets, I use rip stop nylon, which is stronger, but heavier and more expensive.

How I make chutes:

I prefer octagonal chutes because I can cut them with a bit of origami and one chop of a paper cutter. Start with a square of material, and fold it

diagonally. Then fold the triangle in half, then in half again, then in half a 4th time, all folds through the center of the material. You now have a 45 degree pizza slice shaped piece where the two sets of edges don't match up. Use a paper cutter, scissors, rotary knife, or knife and metal ruler to cut a right angle along the shorter of the edges. Especially with Mylar, it is CRITICAL to leave a clean cut with no jaggies, because Mylar will quickly tear once it has a start. Unfold and you should have an octagon. [Practice with a piece of newspaper until you get the Origami right!] For really large chutes like my EggLoft Duration monsters, I add one more fold for 16 corners.

For 1/4 mil competition chutes, I use "B" weight nylon line and the magic yellow "Apogee" tape (now available from Ring Rockets) to attach lines about 3 diameters long from one corner to the opposite corner. I cut double shroud lines twice as long as necessary, so each piece actually forms 2 shroud lines 1.5 diameters. I tie an overhand knot about half the tape length from the end of the line, and fray the last fraction of an inch of the line, to give the tape more grab area to prevent pull-outs. Repeat for as many corner pairs as you have. Then make a loop at the center of the shroud lines and either tie a small knot or run through a snap swivel.

For all other materials (1/2 mil Mylar, Poly, Sunline, Nylon) I use over the top shroud lines. Material depends on the chute: for 1/2m Mylar I use "E" weight nylon, for bigger stuff I use Spectra, Kevlar, or nylon kite line. The lightweight Kevlar thread can cut and tear through Mylar and plastic, so use with caution. Cut them about 4x the diameter, and find and mark the center of each line.

Lay one line so that it's center is in the center of the canopy. I usually set a paint jar or something to hold it in place. Using the yellow tape (or rip stop repair tape on heavier materials), tape the line down at each chute corner. On larger chutes, I'll add 1 or 2 tape tabs between the peak and the edge of the chute. Repeat for all lines. One large square piece of tape attaches all the lines to the center of the canopy.

Turn over the chute and press down the material against each piece of tape to insure good contact. Then gather all the ends and neatly knot. Put a drop of yellow glue on the knot. I use kite snap swivels on my larger chutes for attachment.

Over the top shroud lines don't deal well with spill holes. I don't use spill holes on any of my chutes. On a windy day, I'll either use a smaller chute, or reef the chute by either tying a knot or using a piece of tape along the shroud lines to prevent full opening.

How to pack a competition chute (or any other chute):

My ELD chutes at NARAM-41 and -42 were 57". While my egglofter was a conical design, I'd have had no problem getting one into a hunk of BT-50 if necessary. The only problem I have now is the NARAM-41 chute is still in the air :-), and the NARAM-42 chute was torn on recovery by native cacti. But I just got a 6-pack of 57" pieces from ASP in time for NARAM-46.

Here's a summary of my folding technique, mostly derived from former teammate Alan Jones back in the 80s:

- 1) Talc the chute well. Rub it everywhere on both sides, then shake off any

extra. Without the talc, you'll never get the trapped air out, which is key to packing a large chute in a small space.

2) Spike the chute. Gather all 8 (or whatever number you use) shroud line attachment points together. Do it very neatly, so there are no wrinkles and everything is symmetric.

3) Go through the stack and fold the tips back to the center, one layer at a time. This produces a clipped delta profile. If necessary to further reduce the length of the final package, repeat, this time folding over the other way. This produces a sort of Z fold. This decreases the length of the package, and adds a bit of "spring" to the package, to assist deployment. NEVER fold in a manner that if one fold doesn't open, the next fold can not!

4) Squish out as much air as possible, starting at the tip, and working down to the chute edge. Or work in a vacuum chamber :-)

5) Especially on big chutes, I now fold the whole package in half or thirds lengthwise. Really big chutes get a double or triple Z fold.

6) Roll as tight as possible, starting away from the edge, working back towards the edge and shroud lines. Allow any trapped air to escape.

7) Roll the shroud lines around the chute tightly, but in the OPPOSITE direction that the chute was rolled. This will help to throw the chute open.

8) I now wrap the chute in a protector, essentially one sheet of Quest style wadding, very much in the style of the ancient chute protectors.

9) Pack wadding, then shock cord and chute. I've finally gone to foam plugs at least as one component of my wadding package for standard 3fnc competition rockets.

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