

# Bilgy ParCho

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Three of the four models of the ParCho are shown; each sized to fit your body and the size of your backpack.

The “Porter” (not shown) is similar to the “Backpacker” but accommodates even larger loads.



“No Pack”



“Lightweight Pack”



“Backpacker”

## Advantages

Lightweight, the **ParCho** combines the best features of a **Par**ka and a pon**Cho** for maximum dryness, comfort, and FUN when you're walking in the rain. Your body, hands, and pack will stay dry all day.

## Features

- Added layer for warmth as well as wind & heavy rain protection
- Adjustable ventilation for cooling or warmth and no condensation.
- Roomy, cape-like arms keep hands dry and allow easy removal of hands to the inside for access to pack, water, clothing, etc. Hand straps keep hands covered inside while holding hiking poles, etc.
- Usable as a Pillow, when ParCho stuffed into the interior pocket.



Sized to fit both your body and pack. The ParCho provides another layer of warmth in addition to versatile, comfortable protection for you and your backpack over a wide range of rain conditions, from cold and windy to warm and still. High-to-low ventilation options, and proper clothing management, eliminate the need for heavy waterproof-breathable fabrics. The medium size weighs a mere 7-8 oz., and rolls up to the size of a large hotdog roll. Unique cape-like arms cover hands while allowing 1) full use of hands outside, and 2) easy moving of hands inside to shoulder straps, hip belt, zipper and pocket.

There is even room inside to remove the pack, adjust clothing, access or store items in the pack, and then put the pack back on; all inside the ParCho. Stay dry!

An interior pocket provides dry storage for extra clothing, maps, etc., and, optionally contains the ParCho stuff sack (turn inside out to stuff in ParCho); or, turning the pocket inside out and stuffing the ParCho inside creates a nice, small pillow! Hood volume is adjustable in three ways for either rain/wind protection or to allow more ventilation. The ParCho covers hiking shorts to just above knees (for leg protection you may want to add rain pants). You live comfortably in the tarp-like ParCho, not encased in a parka clamped down by pack straps, and your pack stays dry, too!

**Cost:** Sew it yourself for ~\$60 to \$90 in 10-15 hours.

## Materials List

How much?	What?
3 to 4.5 yds., depending on model	1.1 oz ripstop nylon, silicone-coated "silnylon" (Main body color)  ~4.5 yds. for Backpacker and Porter models ~4 yd. for Lightweight Pack model ~3 yd. for No Pack model  Very large ParCho dimensions may need fabric wider than 60", or more yards; be sure to check layout plans before ordering silnylon.
1/2 yd.	Silnylon (Trim color) for Pocket, Stuff Sack and Hood Visor backing Choose a color that contrasts with the Main Body color, to make it easy to identify the inside and the top of the ParCho.
1 each	#5 coil zipper, YKK Uretek water-resistant, one way separating Zipper length = L" (see page 4 to determine L, the length of the Front Panel). Actually the zipper can be a few inches short of this ideal, calculated length; it only leaves the front bottom open (unzipped) above the knees. If needed, 46" long zippers are available from Quest Outfitters and Outdoor Wilderness Fabrics.
1 each	Double tab slider for #5 YKK coil zipper, so that you can pull the zipper up from the inside, as well as the outside.
4 each (2 extra)	Top stops for #5 coil zipper
3 yds.; or 7 yds. With optional hem drawcord	1/4" wide, <u>flat</u> drawcord, or lacing/round cord
5 each	Cordlock (minitoggle) to match the drawcord or lacing/round cord.
1 yd.	1/2" wide Grosgrain ribbon (for soft, unobtrusive hand straps)
1 yd. each	3/4" hook and loop fasteners (Velcro or similar) – available in various colors
220 yds.	Thread, 100% polyester or nylon in Main Body color or black
1 tube	Silnet Silicone Seam Sealer, or Clear Silicone Adhesive/Sealant (obtainable from an auto parts or hardware store)

## Suppliers

Pattern & materials available from:

Quest Outfitters, <http://www.questoutfitters.com>, 800-359-6931

Seattle Fabrics, <http://www.seattlefabrics.com>, 206-525-0670

46" long water-resistant zippers available from either Quest Outfitters

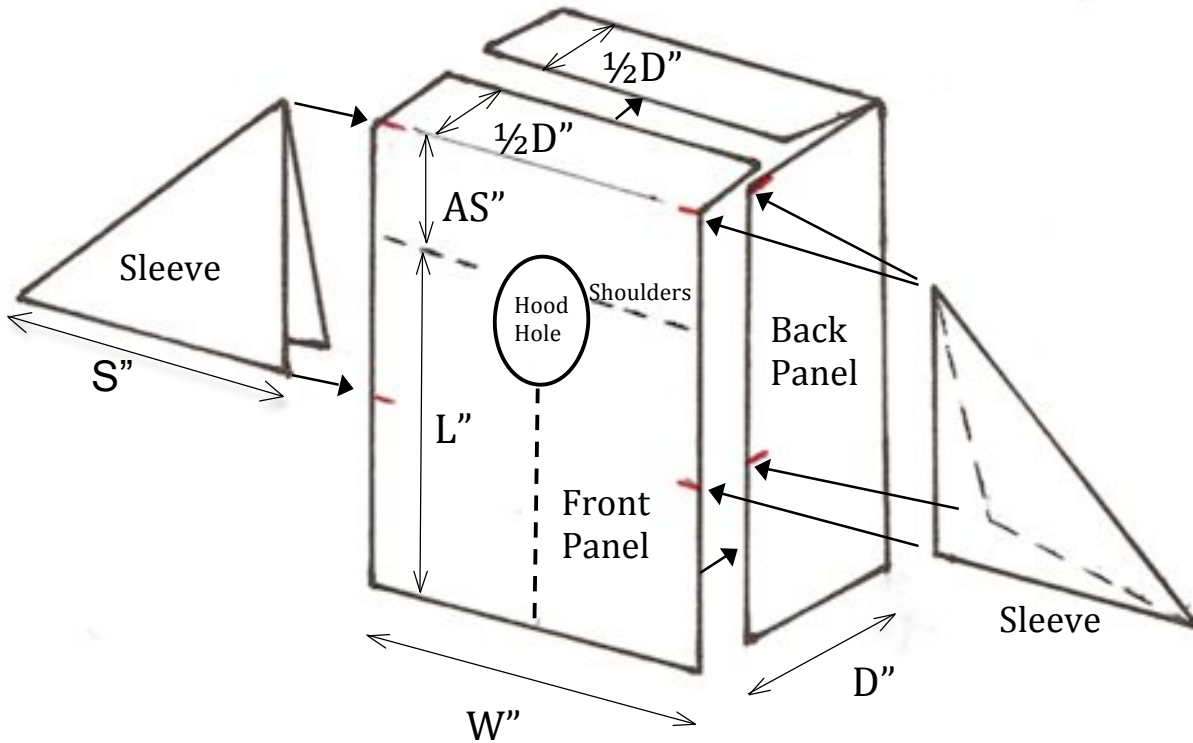
or Outdoor Wilderness Fabrics, <http://www.owfinc.com>, 800-693-7467

## Rain Pants

Simple, very useful rain pants, e.g. RainShed RS500 Pullover Pants, require 1-2 yds. Silnylon and 1.25 yds. of 1" elastic. Pattern from Seattle Fabrics or RainShed, [therainshed.com](http://therainshed.com), (541) 753-8900. Refer to last page of these instructions for more discussion.

## ILLUSTRATION of PARCHO SIZING & ASSEMBLY

Width, **W"**, and Length, **L"**, of the ParCho are sized per the user's body size, height and weight, as shown on page 5.



There are **4 ParCho styles** based on the pack size (discussed on next page):

Above Shoulders, **AS"**, projection of the backpack.

Depth of backpack, **D"** (front to rear, and freely adjustable to pack size),

ParCho Style	<b>AS"</b>	<u>~Usable Pack Projection</u>	<u>Typical D"</u>
<b>No Pack</b>	<b>0"</b>	0" to 5"	0"
<b>Lightweight Pack</b>	<b>0"</b>	0" to 5"	10" to 12"
<b>Backpacker</b>	<b>6"</b>	0" to 12"	12" to 14"
<b>Porter (giant pack)</b>	<b>12"</b>	0" to 18"	14" to 18"

Sleeves extend to top of the above-shoulders projection, AS, which:

- simplifies assembly and sewing; i.e., sewing the Sleeve to Back panel, and sewing the tops of the Front and Back panels (where  $\frac{1}{2}D''$  are shown above) precisely maintains the matching of the front of the Sleeve to the Front panel.
- adds additional flexibility to accepting a bulkier pack above the shoulders.

Sleeve size, **S"**, is adjusted to both the user's height and the ParCho style, as listed on the silnylon layout diagrams for each ParCho style.

## Choosing the ParCho Model and Size That's Best For You

**No Pack** The "No Pack" is for the day hiker who carries no more than a small daypack and wants minimal bulk.

**Lightweight Pack** The "Lightweight Pack" is the best choice for those who have packs that have been cut back on weight and volume. Loads projecting 4 to 6 inches above the shoulders work fine with this model.

**Backpacker** The "Backpacker" is versatile and flexible, and a good choice for backpackers carrying an external frame or somewhat tall pack. Without a pack the ParCho's backside will hang a little lower than the knee, as shown here, at right. When the pack projects 10 to 12 inches or so above the shoulders, as shown on the cover page, the back of the ParCho is above the knee but still hangs behind your legs, like an umbrella, for OK coverage.

**Porter** The "Porter" covers high, bulky, heavy loads that extend over the shoulders as much as 18 to 20 inches; typical for porter's bulky loads.



### Determining the Right Size

The ParCho can be custom-fit (a rare opportunity) to both your body and your pack to keep it from being either too small or too large, unwieldy and subject to blowing up in the wind. Based on your height and weight, find your ideal ParCho width,  $W$ , and length,  $L$ , in the chart on the next page. If your dimensions fall between the ideal dimension lines shown, round up to the next inch larger.

For my body,  $W =$  \_\_\_\_\_ inches, and  $L =$  \_\_\_\_\_ inches

The length,  $L$ , determined above puts the bottom of the ParCho within a couple inches of your kneecaps. That is long enough to cover and protect reasonable-length shorts without encumbering your legs (thighs) as you lift them going up hills or steps, while maintaining good ventilation; a versatile, protective height. The maximum standard bottom hem of 2½" can be adjusted to add 0 " to 2" to the total length. Hemming is the last step, so you have a chance to try the ParCho on and to make a minor adjustment to the length if you wish. If you have other length requirements, make that adjustment now (or add material at the end).

### Measure Pack Depth

Decide on the pack, if any, you will be wearing under the ParCho. To measure the depth ( $D$ ), lay the loaded pack on a flat surface. Since the pack space in the ParCho covers the whole width of the ParCho back, small high points can be ignored; something near the average depth of the pack is probably best. If in doubt, a little larger is better than too small. ("Typical"  $D$  values were shown on the previous page 3.)

My pack Depth,  $D =$  \_\_\_\_\_ inches. ( $D = 0$  inches for no pack at all.)

### Measure Height of Pack Above Shoulders to Choose ParCho Model

Next, put on the pack, fully loaded, and see how much it projects Above Shoulders.

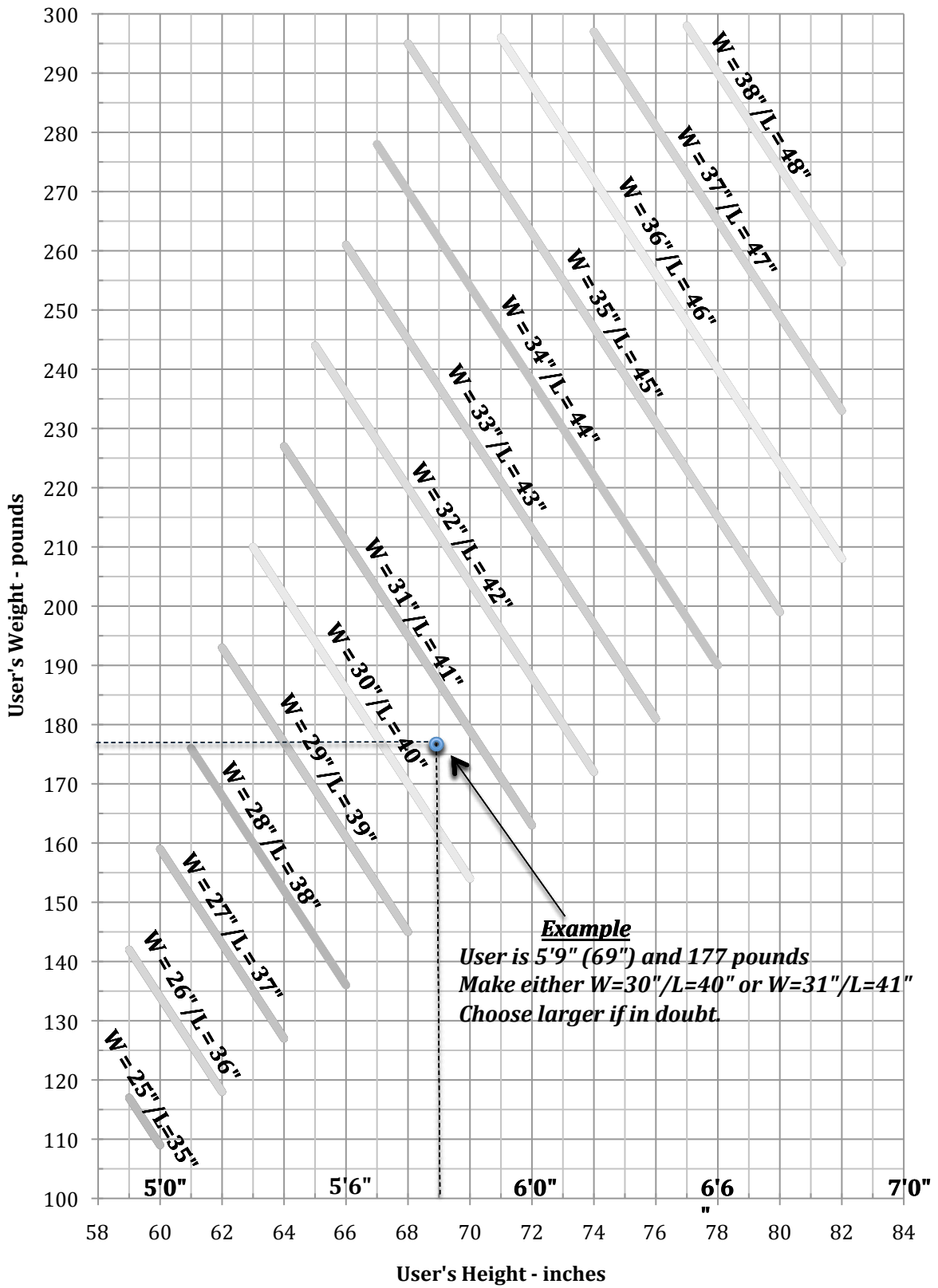
My pack top is Above Shoulders,  $AS =$  \_\_\_\_\_ inches.

Based on  $AS$ , and the model descriptions above I choose ParCho model \_\_\_\_\_

### Select Sleeve Size and Calculate Amount of Silnylon Needed

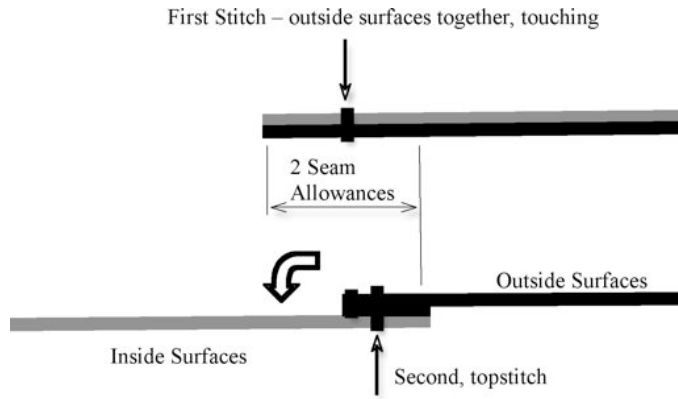
Go to the silnylon fabric layout for **your ParCho model** to select the raw, square size of sleeve,  $S$ , based on your height. If your height is between chart values choose the next larger height/sleeve size combo (better than smaller).

**On your ParCho layout, with the values of  $L$ ,  $W$ ,  $D$  and  $S$ , calculate the total amount of silnylon needed;** adding on another ½ yard or so of the silnylon, you will confidently order sufficient materials.



**Find your height & weight on chart to determine your ParCho size**

## Sewing Terms



**Seam allowances** are 3/8 inch; in general, topstitch 1/8 inch from first stitching line. Exception: The square Sleeve panels are *hemmed 1/2"* on two sides, which simplifies the distances between matchpoints on the Front and Rear panels.

**Outside** is the "right-side" of the fabric. The **Inside** is the normally hidden "wrong-side", on the inside of a garment.

**Stitch Length.** Stitch about 12 stitches per inch, using ordinary 100% polyester thread and a new #70 or #80 needle. Back stitch often to lock the threads and to minimize damage if a thread is cut during use.

**Bartack** means straight stitch over and back, then overlay with a narrow, tight zigzag.

**Topstitch** means to fold over the seam allowance and topstitch over the seam allowance 1/8" (for this project) from the first stitching line. Strengthens the seam.

**Silnylon** means 1.1 oz., high tenacity, ripstop nylon, silicone impregnated and weighing 1.3 to 1.4 oz./sq. yd. The coating penetrates the material, so both sides can be either right or wrong; they both look the same. Various listed in catalogs as 1.1, 1.3, or 1.4 oz. ripstop nylon, silicone coated.

**Selvedge** is the specially woven, longitudinal edge of the fabric that prevents it from unravelling. Often it is not smooth and needs to be removed from the fabric edge.

## Sewing Techniques

**Marking silnylon** with chalkboard chalk, a builder's chalkline or silver-colored "metallic Sharpie" permanent markers work well. Sharpie Marks can be easily removed with a rag wetted with paint thinner.

**Cutting silnylon** with a hot knife (i.e., soldering iron with dull, knife edge) extends the life of cut edges by fusing them. However, the silicone coating generally holds the cut edges together if the seam allowances and hems are not directly exposed to damaging abrasion. (Hot cutting is very effective on uncoated synthetics.) Hot cutting requires a smooth, heat-tolerant surface such as glass or hardboard. (Two or three 4' x 6' pieces of hardboard, taped together, work well; the factory-produced, squared, edges provide easy reference lines for laying out the rectangular parts.)

**Positioning webbing and Velcro** pieces on the slick silnylon can be tricky. If so, align the materials and run a long stitch line (easy to remove if the parts don't line up properly) right down the middle or edge, stopping when necessary to realign the parts. Alternatively, use glue stick to hold the parts in place. After sewing such pieces, be sure to clean glue off the needle and presser foot.

**Pin** only near the sewing line; you'll be seam sealing there. Pins perpendicular to the sewing line don't get caught under the presser foot. Pin long seams evenly the last 6 inches on each end, and then stretch by either 1) pinning to a carpet or 2) duct taping to a hard surface or floor; then pin evenly along the length. Before sewing, check backside of pinning and remove any puckers or folds.

**Sew by lightly stretching**, holding outside the pins ahead of and behind the needle, to prevent puckering of the top layer of material ahead of the presser foot. Let the machine do the feeding.

*Dimensions given for all the ParCho's parts are exact for better fit and easier assembly.*

# Layout & Cutting

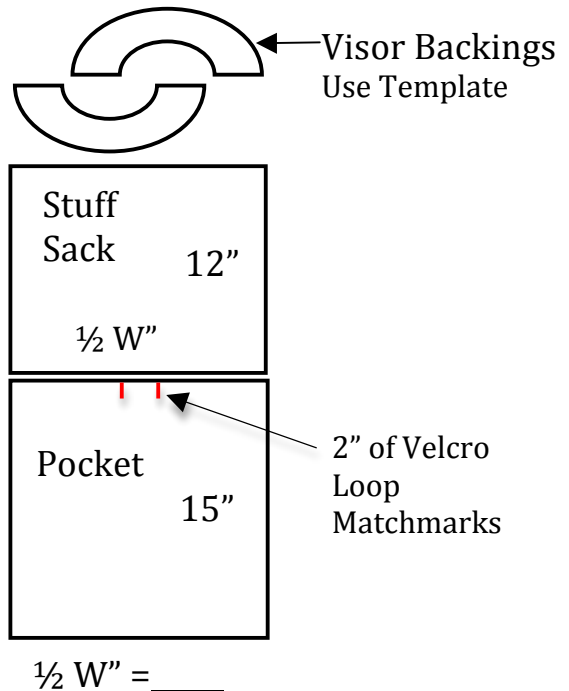
## 1 Trim Color Silnylon ~ $\frac{1}{2}$ yard

### Visor Backings, Stuff Sack, and Pocket

Write the value,  $\frac{1}{2}$  of W (you will find W on page 4), into this layout diagram.

**Stuff Sack** is  $\frac{1}{2}$  W inches wide by 12 inches high. Layout and cut.

**Pocket** is  $\frac{1}{2}$  W inches in width and 15" in height. Layout, cut, and mark the position for 2" of Velcro loop fastener, centered on the Pocket edge as illustrated.



**Visor Backings** are cut using the paper Visor Backings pattern (or tracing it onto cereal box cardboard, to make the silnylon easy to cut using a soldering iron). Lay out two Visor Backings, being sure to flip the pattern so that they are mirror images of each other.

Cut the Visor Backings. Using a "metallic" Sharpie marking pen, mark the matchmarks.

## 2 Main Body Color Silnylon ~3 to 4.5 yards

**Front & Back Panels, 2 Sleeves and 2 sides of Hood.**

***On the layout diagram for your ParCho model, enter the values for W, L, D, & S*** from page 4 (under “Right Size”, “Pack Depth”, “Sleeve”); make all calculations required on the layout diagram. Copy or tear out the layout diagram for ease of use and to avoid referring to the other, wrong layouts.

Lay out parts as shown on the diagram, marking cutting lines on silnylon with a marking pen such as a “metallic” Sharpie and chalk line, if you have one.

Before cutting: Read all special instructions (below, steps 3-6) and double-check sizes and dimensions!

## 3 Front Panel

Check all dimensions, and mark matchmarks for mating with the Sleeves. Upper Sleeve matchmarks are  $\frac{1}{2}D$ ” from the top; mark them first. Then, measure **S” minus  $\frac{1}{2}$ ”** farther down to locate the lower matchmarks (=  $\frac{1}{2}D$ ” + S” –  $\frac{1}{2}$ ” total from top of Front panel).

On the centerline, mark the Hood opening (Consult the layout diagram. Bottom of Hood opening is L” – 10” from the bottom of the Front panel; the top of Hood opening is at L” + 2” from the Front panel’s bottom).

Mark the Pocket matchline 15” below the bottom of the Hood opening, on the left side.

Cut out the Front and the Hood opening.

Cut the zipper/centerline from the bottom edge of the Hood opening to the bottom edge of the Front.

## 4 Back Panel

Check all dimensions, mark all Sleeve matchmarks (exact same distances from the top of the Back as described above for the Front panel). Then cut out the Back.

## 5 Sleeves

Be sure to mark the Hand Strap and Wrist Band matchline as shown on the layout drawing, on a diagonal which intersects the outer edge of the Sleeve, 12” from the corner. Since these are right and left Sleeves, they, and this matchline, must be mirror images of each other. Cut the Sleeves.

## 6 Hood

Just like the Visor Backing pieces, the two Hood pieces must be mirror images of each other.

To do this, you can cut one piece, then flip the pattern and cut the other, being careful to align pieces on the grain line of the silnylon fabric. Alternative methods to layout work:

a) Using the supplied paper pattern directly or tracing it onto cereal box cardboard, lay the pattern *on top* of silnylon to lay out, mark and cut. Be sure to mark the match marks.

b) Transfer matchmarks to the opposite side of the paper pattern while holding it on a lighted window or computer screen. Lay the pattern *under* the translucent silnylon to layout, mark, and cut.

Mark the matchmarks on the inside (wrong side) of each Hood piece. On the outside of each Hood piece, mark the locations of the buttonholes and Velcros.

Cut the two Hood pieces.

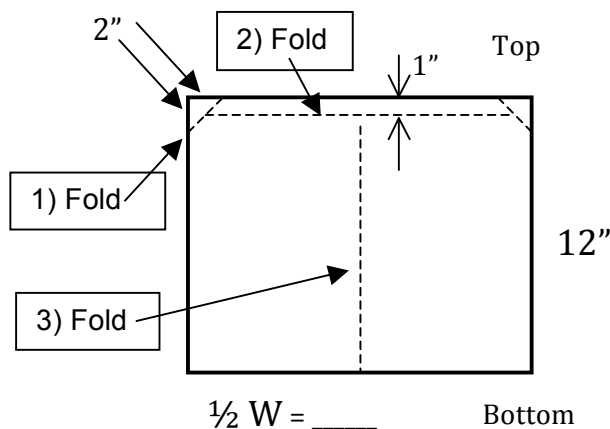


# Sewing of the ParCho

Silnylon is slick and can be difficult to sew. Start with the Stuff Sack and Pocket to gain practice before you tackle the larger parts of the ParCho. (See "Sewing Techniques" for suggestions.)

## 7 Stuff Sack

1) Fold: Fold over the two top corners (on the  $\frac{1}{2}$  W"-long topside) 2 inches to the *inside*, on a 45-degree angle as shown, and stitch.



2) Fold: Fold the top edge of the Stuff Sack 1" to the inside and stitch  $\frac{3}{4}$ " and  $\frac{5}{8}$ " from the top to form the drawcord sleeve.

3) Fold: Fold on the centerline, outside together. Double stitch along the bottom and side. Bartack 1" to 2" of the side just below the end of the drawcord sleeve.

**Thread 32" of the  $\frac{1}{4}$ " flat drawcord**, or lacing/round cord, through the sleeve and cordlock. Using a figure-8 knot, tie the loose ends together so that they cannot pass through the cordlock.

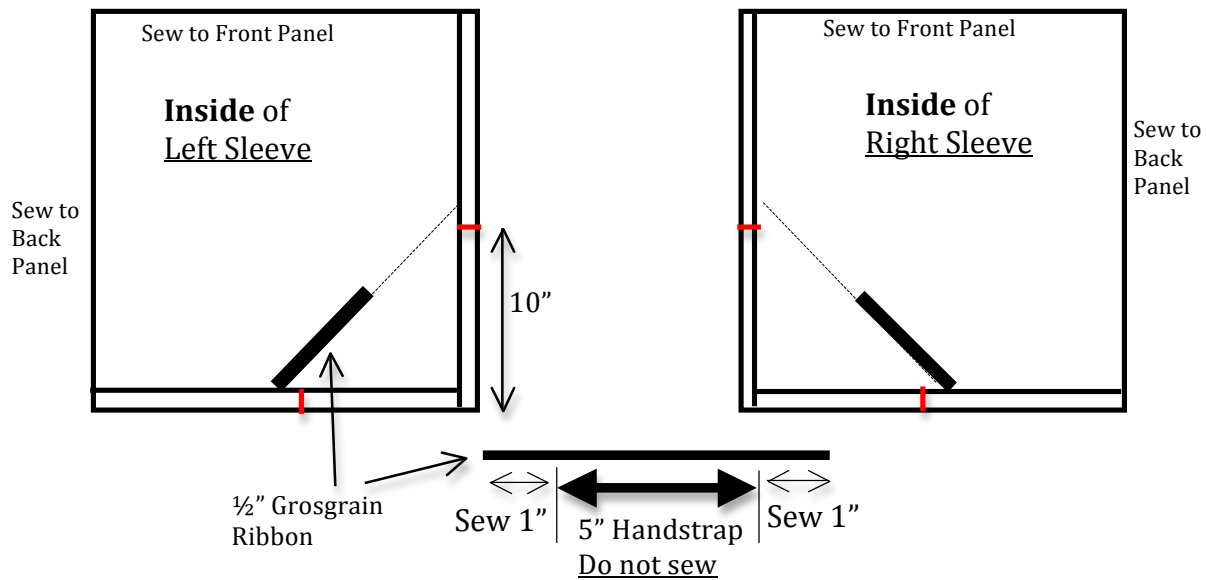
Set Stuff Sack aside. Later, we will have the option to sew the Stuff Sack, inside out, to the inside of the Pocket to secure the Stuff Sack and to allow some storage of items while the ParCho is in use. To avoid having it erroneously sewn into some seam, we will wait to optionally attach the Stuff Sack during sewing of the Pocket to the Front Panel.

## 8 Pocket

**Sew a 1" hem** (because your Velcro is  $\frac{3}{4}$ " wide) on the edge of the Pocket having the Velcro matchmark (the  $\frac{1}{2}$  W" wide top end shown on page 7, step 1). Topstitch  $\frac{1}{8}$ " from the seam. This is the top edge.

**Sew a piece of  $\frac{3}{4}$ " Velcro loop 2" long** onto the center of the hem (on the inside of the Pocket at the center of the top hemmed side, aligning it with matchmarks). Sew around outer edges. Set aside.

## 9 Sleeves



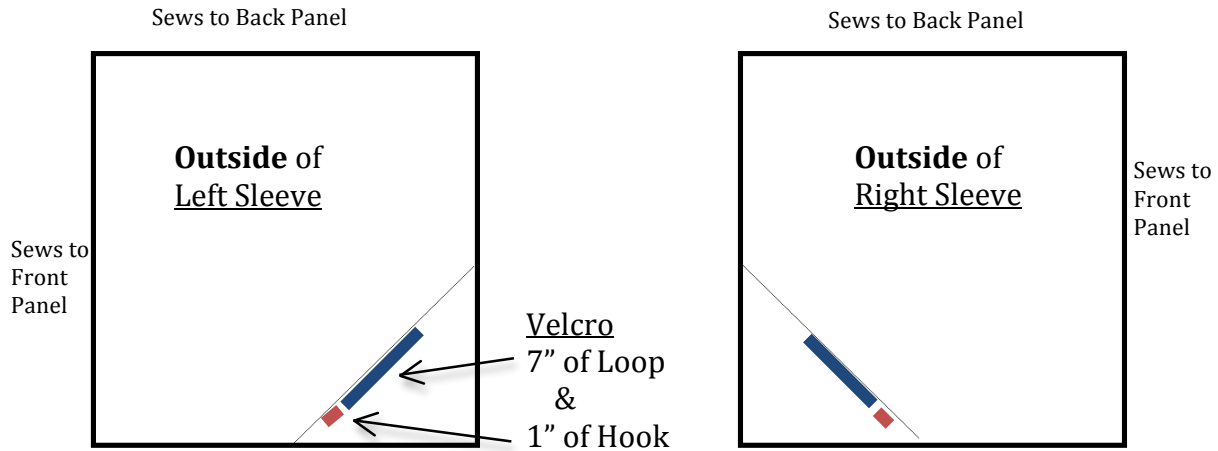
**9a** Before hemming, be sure the Hand Strap & Wrist Band matchline is marked 12" from the corner as shown in the silnylon fabric layout and that the matchlines are mirror images, as shown in the layout illustration and the above illustration. Fold onto the inside and sew a  $\frac{1}{2}$ " hem on the two edges of the sleeve touched by the Strap matchline (the dashed, diagonal line) as shown above.

**9b** Mark the hand-opening matchpoints, shown in red above. Stretch out the fabric from the hemmed corner so that the 10" opening is accurate, i.e., not elongated by wrinkling. Marking now will ease final assembly of the ParCho. *Topstitch the 10" openings with a zigzag stitch that is close to the edge of the fold; the zigzag stitch will to secure the opening to your hand movement during ParCho use.*

**9c** Referring to the above figure, align a 7-inch long piece of  $\frac{1}{2}$ " Grosgrain ribbon for the Hand Strap with the matchline; *the side of the ribbon not contacting the matchline is farther away from the corner of the hemming – important locating.* Start the Grosgrain's layout at the inner edge of the  $\frac{1}{2}$ " hem as shown above. Box stitch 1" of each end at the Grosgrain, leaving a 5" section in the middle unsewn, also shown above. Suggestion: Use paper glue to hold the 1"-ends of the Handstrap in place while sewing.

**9d** Flip the Sleeve over (top to bottom) in order to locate and sew on the Velcro wrist band on the outside of the Sleeve, as shown in the figure of step 9e, below. (The Velcro wristband will aid fixing the Sleeve above the hand if needed during handwork.)

**9e** Place the  $\frac{3}{4}$ " wide Velcro on the Hand Strap and Wrist Band matchline with *the side not contacting the matchline closer to the corner*, which puts the Velcro side-by-side with the inside Grosgrain ribbon, not on top. This location is ideal placement. First, place 1" of Hook starting  $\frac{1}{2}$ " from the edge as shown below (at inner edge of the  $\frac{1}{2}$ " hem inside); box sew it into place. Next, place the 7" of Loop about  $\frac{1}{4}$ " beyond the Hook; box sew it.



**9f** Your hand in the  $\frac{1}{4}$ " Grosgrain loop inside keeps the Sleeve in position (left photo shows left sleeve), and your hand dry while you're holding a hiking pole (right photo). You can use the outer Velcro (middle photo) to fasten the Sleeve to your wrist before folding back the Sleeve's pointed end (right photo), and be able to work with your bare, or gloved, hands.



**Inside of Left Sleeve  
Hand in Grosgrain Loop**



**Outside of Left Sleeve  
Velcro Hook & Loop**



**Left Hand in Grosgrain & Sleeve  
Right Sleeve Velcroed & folded back**

**9g** Repeat Steps 9a thru 9e for the other Sleeve and set Sleeves aside. Do not sew them to Front or Back yet.

## 10 Hood

**10a** Cut two 1" square pieces of silnylon to use as reinforcements for the buttonholes. Sew the 3/8-inch-long buttonholes where marked in both Hood pieces, reinforced inside with the 1" square of fabric.

**10b** Stitch the Visor Backing to the Hood piece, right sides together, at the curved front edge. The matchmarks (on the wrong sides of both pieces) will *not* be touching. *Do not topstitch this seam!*



**10c** Notch the seam allowance every inch, being careful not to cut the stitching.

**10d** Repeat steps 10a, 10b and 10c for the other half of the Hood.

**10e** Right sides together, sew together the two Hood pieces, starting from the neck, along the back and over the top of the Hood, keeping the Backing-Hood seam allowance folded toward (onto) the Backing, as shown. Turn Hood right side out. Pin seam allowance to one side and top stitch over seam allowance, 1/8" from seam; topstitching from the inside of the Hood may be easier.



**10f** Fold the notched seam allowance of the Hood-Backing seam toward/onto the Visor Backing. Open the Hood and, from the right side of the Visor Backing, topstitch through the Backing and the seam allowance 1/16" from the seam. This stiffens the seam allowance and ensures a tidy Hood-Backing seam at the front edge of the Visor.



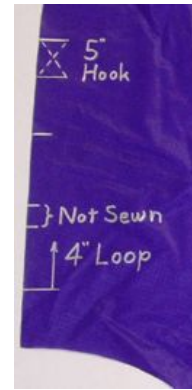
**10g** See figure below. Fold the Visor Backing to the inside of the Hood (the wrong sides will be together and the matchmarks will be facing each other). Align the matchmarks and pin, ensuring that the Backing is folded exactly on the seam so that the Backing-Hood seam presents a tidy appearance. Topstitch the outer, sewn edge of the Visor to stabilize the edge.

**10h** Stitch Backing to Hood 1/4" from the other, unsewn inner, edge of the Visor Backing. Stitch again 3/8" from that edge. Finally, stitch 1/2" from the outer edge of the Visor, making sure the stitching does not interfere with the buttonholes and that the stitching lies between the buttonholes and the outer edge of the visor.



## 10i

Sew Velcro visor adjusters on the back seam of the Hood as shown on the Hood pattern, taking care to leave a  $\frac{3}{4}$ " section of the Loop unsewn. This will allow the chinstrap (sewed on in next step, 10j) to slide between the Velcro and the Hood.



## 10j

Sew drawcord chin adjusters onto sides of Hood.

Cut two 15" lengths of the  $\frac{1}{4}$ " flat drawcord (or lacing/round cord) and heat sear ends to prevent unravelling. Sew ends of the drawcord to the sides of the Hood as shown here and on Hood pattern.

Pass the free end of one of the drawcords through the unsewn section of the Velcro. Pass both drawcords into a cordlock. Position the cordlock so that it is about  $\frac{1}{2}$ " from the Velcro loop, and with sufficient lengths of the drawcords so that the Hood is not wrinkled, as shown.

Tie a figure-8 knot. Leaving about 2" of drawcord beyond the cordlock, for easy pulling with your fingers, cut off any other excess drawcord.



## 10k

Install the visor drawstring into the front of the Hood, using 36" of the  $\frac{1}{4}$ "-wide flat drawcord, or lacing/round cord. Thread drawcord into the buttonhole on one side of the Hood, through the sleeve formed by the Backing and the Hood and out of the buttonhole on the other side.

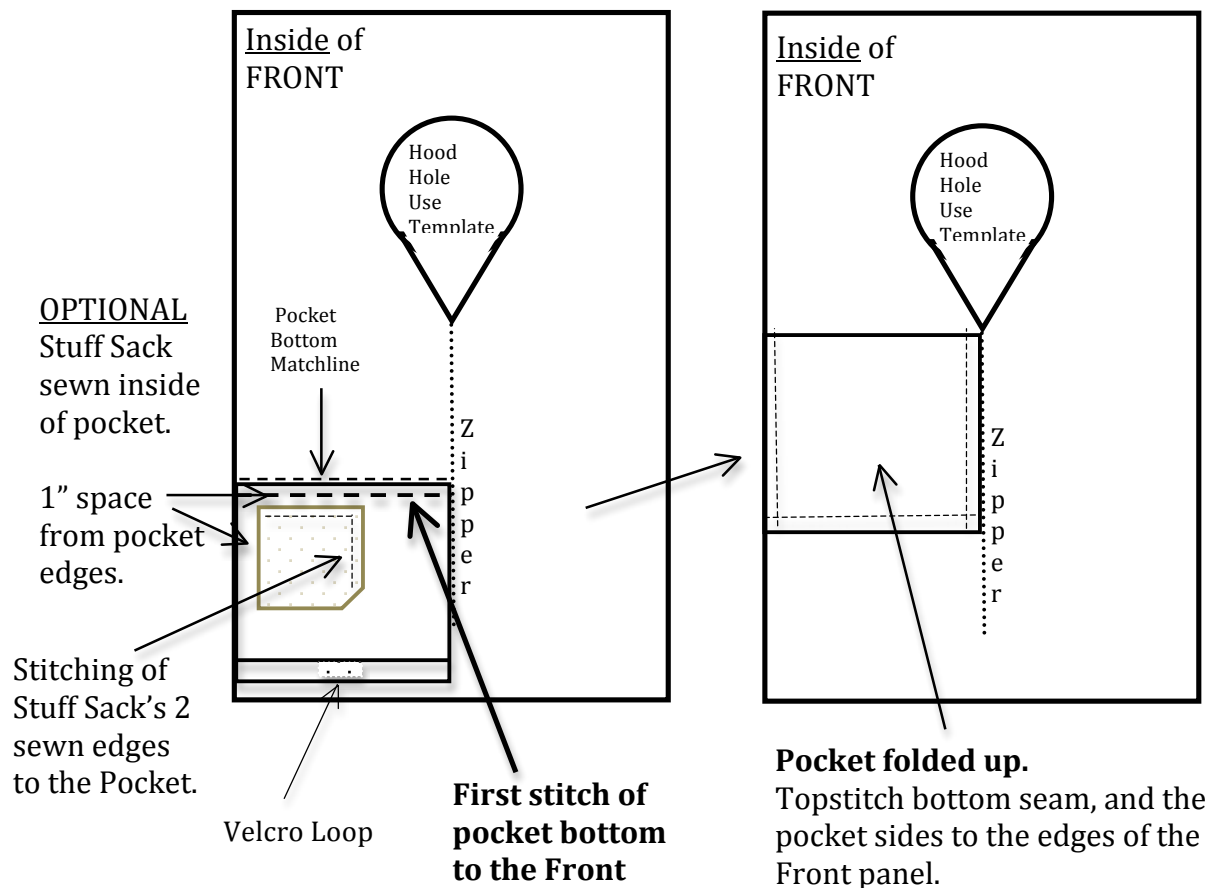
Slide cordlocks onto both drawcord ends and knot both ends with a figure-8 knot on a bight (i.e., a doubled-over cord end) and cut off excess cord.

Optionally, just sew one end of the drawcord at the buttonhole, and use a single cordlock on the loose cord end. This method saves a cordlock but requires some readjustment of the Hood opening. Set aside Hood while you sew the Front.

# 11 Front Panel

## 11a Sew Pocket to Inside of Front Panel

**OPTIONAL:** Having the Stuff Sack attached to the inside of the Pocket (from Step 8) assures never losing the Stuff Sack, and puts it in a convenient location to routinely hold rain pants or other items, separated from other items going in and out of the Pocket. With the Stuff Sack inside-out (and flat) and 1" from the Pocket side and bottom edges, as shown below, stitch only it's two previously sewn sides to the pocket; sewn on top of, our alongside & outside of, the Stuff Sacks seams. This keeps the Stuff Sack seams out of the backpacking-stressed seams of the main body of the ParCho.



**11b** Match the bottom of the Pocket to the Pocket bottom matchline, the right side of the Pocket to the wrong side of the Front. The Pocket will be "upside down" with respect to the Front, the opening down below the matchline, and the Velcro loop visible. Stitch the Pocket to the Front, 3/8" from the edge of the Pocket.

**11c** Fold the Pocket toward the top of the Front panel. The Velcro loop will now be facing the inside of the Front panel. Topstitch ~1/8" from the fold.

**11d** Align Pocket with respect to the Front so that there are no wrinkles, and position a 2" piece of Velcro hook on the inside of the Front so that it mates with the 2" Velcro loop on the Pocket.

Mark the matchpoints and border sew on the Velcro hook. The top of the yellow pocket in the photo has been folded back to show the mating of loop and hook.



*Note that the photo shows the Stuff Sack pinned (or possibly stitched 1 to 2 inches) to the inside of the Pocket, **another option**. Do not position the Stuff Sack at this time! Positioning the Stuff Sack in this fashion must be done after Front to Back sewing, step 12d, is done. This attachment assures never losing the Stuff Sack, and puts it in a convenient location to routinely hold rain pants or other items, separated from other items going in and out of the Pocket.*

**11e** Match and sew the sides of the Pocket to the edges of the Front panel about ¼" from the edges, to keep Pocket in place during later assembly.

## **11f Sew Hood to the Front Panel**

Pin Front panel to the Hood. Easiest pinning is with the Hood right side up and Front panel on top (of course, the outside surfaces of both are in contact). First pin the center top of the Front to the center back of the Hood (the seamline); then pin every 1" to 2" from centerlines to the zipper ends.

It is best to do sewing with the Front panel on top; adjust Hood and Front materials around seam area as required so that Front material does not pucker. Stitch. Fold the seam allowance up toward top of Hood (minimizes neck scratching when wearing the ParCho), and topstitch seam allowance in position.



## 11g Sew Zipper to Front

**Cut zipper to the length L”** (A few inches short would only leave the bottom of the Front open above the knees – passable.)

Install a double pull slider, which allows you to work the zipper from inside the ParCho and keep your hands dry.

Remove 1/4" of teeth or coil from the cut, top end with fingernail clippers.

Install a top stop on one side of the zipper, crimping top end of the coil securely under the top stop. Repeat for the other side of the zipper.

## 11h Here is a method for installing zipper so that left & right sides are properly aligned:

Close the zipper. On the wrong side (non-glossy side), mark the edges of both sides of the zipper every 6 in., making sure that a line between the mark on one side and the mark on the other would be perpendicular to the coil. The square end of a ruler works well here.

Align front zipper edges of the Front pieces together, right sides up (inside surfaces together), and pin at the ends. Then, tape the ends of the Front to the table, to straighten and slightly stretch the fabric.

Match zipper's top end with the Front edge at the Hood opening. Starting there, transfer the zipper marks to both left and right Front pieces.

Referring to the illustration below, open the zipper and position each zipper half on the Front piece, right sides together (glossy side of zipper against outside of Front), marked edge at the cut edge of the Front, matching marks. Pin at the marks.

First stitching: Using a zipper foot, sew close to the teeth but far enough from them (1/8") that the zipper pull is able to slide by.

Second stitching: Fold (on the stitching) the seam allowance to the inside and topstitch ~1/4" from the zipper coil.

### Zipper sewing illustration

Left: First line of stitching is complete, 1/8" from the zipper coil. The non-glossy side of the zipper is up. The coil and pull slider are visible on this side.

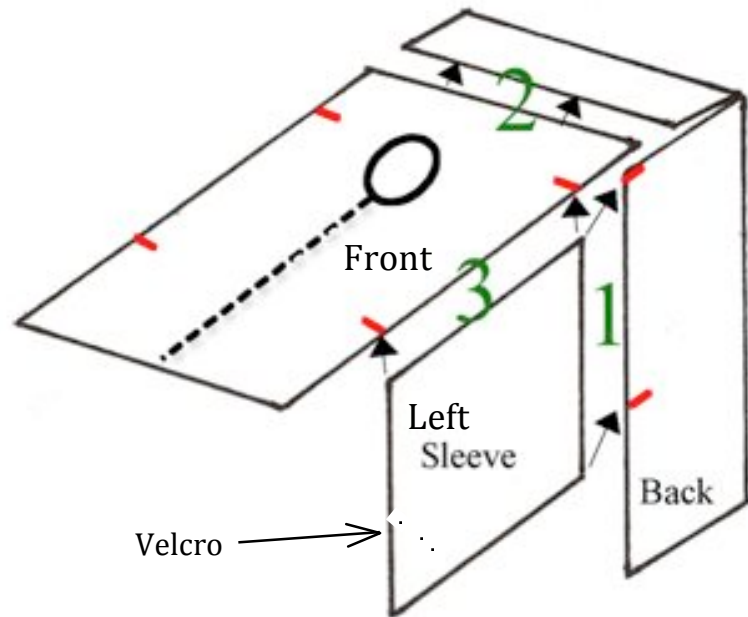
Right: Second line of stitching is complete. The zipper has been folded to the inside and topstitched 1/4" from the coil. The glossy side of the zipper is now toward the outside.



***All major parts (Front and Rear Panels and Sleeves) are now complete, and ready for final assembly.***

## 12 Final Assembly of Front & Back Panels & Sleeves

Outside surfaces of the Front panel, Left Sleeve, and Back panel are shown in this illustration



### 12a 1 Sew Sleeve to Back Panel

**Seam #1 in the diagram above.** Referring to the above figure and the Sleeve figures shown in steps 9 and 9e (on pages 10 and 11, the figures show which edges of the Sleeves are sown to which panel), sew the Left Sleeve to the Back. With right sides together, match the top corner of the left Sleeve (which is diagonally opposite the Velcro Wrist Strap) to the top left outside corner of the Back, matching the edge of Sleeve with the edge of the Back and the bottom of the Sleeve with the lower matchmark on the Back panel. Stitch.

Turn over the seam allowance onto the Back panel, which insures the matchpoints for step #3 will be precisely located; also, continue the 3/8" seam allowance foldover to the bottom of the Back panel, which prepares for a later, not now, strong, simple sewing of the Back panel to Front panel. Topstitch.

Repeat for the right Sleeve, matching corner of Sleeve to top right outside corner of the Back.

### 12b 2 Sew together tops of the Front and Back Panels

**Seam #2 in the diagram.** With right sides together, match the top edge of the Front to the top edge of the Back and stitch. Use the same 3/8" seam allowance here as used in sewing Seam #1, to assure that the Sleeve will accurately match the Front panel matchmarks. Topstitch.

### 12c 3 Sew Sleeve to Front Panel and top of pack cover

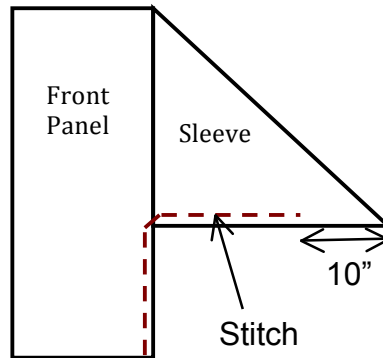
**#3 in the diagram above.** Confirm that the Sleeve to Back panel seam allowance is folded onto the Back panel (NOT the Sleeve). With right sides together, match the top corner of the Sleeve with the top matchmark on the Front panel. Also, match the bottom corner of the Sleeve with the bottom matchmark on the Front. Stitch, in one straight seam, from the fold at the top of the pack cover (at the backside of the Back panel) to the bottom of the Sleeve.

Fold seam allowance toward/onto the Front and topstitch, continuing to the bottom of the Front, making a 3/8" wide hem onto the bottom of the Front.

Repeat for other Sleeve.

## 12d Sew Sleeve Bottoms & the Front to the Back

Turn ParCho inside out. With right sides together, match and pin the hemmed/bottom edges of Sleeve. If not already marked in step 9b, make a mark on the hem exactly 10" from the Sleeves pointed end (Defines the hand opening size and position relative to the positions of the interior Hand Strap and the exterior Wrist Band. Be precise.)



Right sides together, match the Front to the Back below the Sleeves and pin. Beginning at the 10" hand-opening mark, stitch the Sleeve together  $\frac{3}{16}$ " to  $\frac{1}{4}$ " from the edge. Where the Sleeve joins the Front/Back, turn the corner (close to corner to minimize puckering of the corner when Sleeve is turned right side out) and continue sewing, attaching Front Panel to the Back Panel below the Sleeve.

Stitch again  $\frac{1}{16}$ " inside the seam, i.e.,  $\frac{1}{16}$ " farther from the edge, rather than topstitching. Bartack the end of the seam at the mark (the hand opening). With the 2-layer folded fabric edges this is a very strong seam.

## 12e Hem ParCho's Bottom

Usually the distance from the zipper bottom to the unfinished bottom edge is about  $2\frac{1}{2}$ ". Make the hem from  $\frac{1}{2}$ " to  $2\frac{1}{2}$ ", depending on how long you want the ParCho to be at your knees. (Longer gives more coverage of your shorts, but you don't want it to be so long that it impedes your legs when you are hiking uphill.)

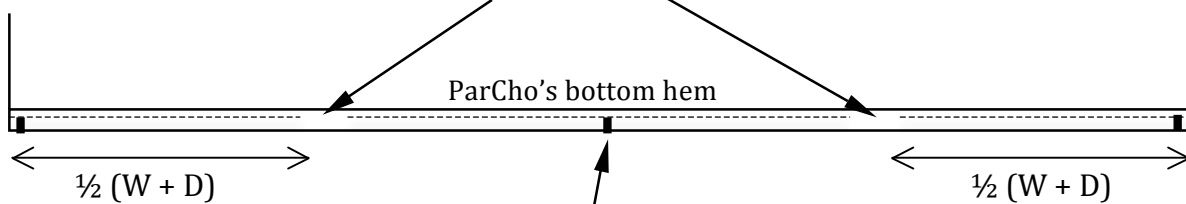
**Before sewing hem, refer to the following optional drawstring.**

## 12f Optional: Sew Drawstrings in Bottom Hem

The drawstrings avoid holding down the ParCho's bottom with your hands in very high winds. Pulling the drawstrings through the two cordlocks some 10" reduces the area of the ParCho bottom nearly 75% while maintaining leg room for walking. Open up for ventilation in low winds.

### Sewing Drawstring/Cordlock Opening in Bottom Hem

Leave ~1-inch gap in hem stitch or, Before hemming sew 2 button holes, 1-inch apart, on the hem side, not the outside.



After threading cord through hem and cordlocks, bartack drawstring at the middle of the hem and both zipper ends

**Sewing Done! Now, Seam Seal.**

## Seam Sealing

You will need:

- 100% silicone adhesive/sealant, clear, from auto parts, paint, or hardware store; or Silnet from sports or outdoor fabric stores. Other seam sealers do not work on silicone-coated materials.
- 1-inch tapered brush (a 50-cent bristle brush from the paint store works great).
- A few ounces of paint thinner (mineral spirits).

Squeeze (extrude) 10 to 12 inches of silicone into a small, 12 to 18 oz. jar; add about double that amount of paint thinner. Shake for 30 to 60 seconds, until the mixture is completely mixed and of uniform consistency. Adjust, if necessary, to the viscosity of quality latex wall paint.

Brush mixture onto all external seams, working the sealant into the seams and threads as the sealant is absorbed. Cover at least a half-inch on both sides of the seams to cover any pinholes left from sewing. Lay the ParCho on a table surface to support the brushing action on all the external seams. Start from either the top or bottom of the ParCho and work toward the other end. (Expect that some paint thinner may penetrate the fabric and wet the table surface; simply wipe off the tabletop or let it dry by itself.) After the outside seams are sealed, hang the ParCho on a hanger to dry; then seal the Velcro & drawstring stitching on the inside of the Hood, and seal the wristband Velcro on the inside of the Sleeve.

Clean up brush and bottle with paint thinner. A second coating, after the first is dry, adds assurance.

## Using Your New ParCho

**Putting it on:** Facing into any wind and stepping forward, flip the ParCho over your head and onto the pack; put on the Hood to help locate sleeves, if needed. Lift your arms out to the side to push your hands into the sleeves, or into the hand/wrist straps. If needed, slide back the sleeve end to get the Velcro wrapped around your wrist; then fold back the sleeve's end to completely free up your hands if needed.

**Clothing:** Wear minimal clothing to reduce sweating, and to provide warmth directly to the inside surface of the ParCho to minimize condensation. Ideally, hike on the slightly cool side for better hiking energy/efficiency. Adjust clothing as conditions change, more layers when needed, and even down to no shirt when hot. During temporarily colder conditions, warm arms and hands inside the main body. Hood's rear Velcro adjusts volume to your head and/or hat. In high winds, the Hood's front drawstring reduces face opening and the back drawstring clamps the Hood to your chin. The ParCho provides some extra warmth in cold weather.

**Ventilation:** In cold, windy rain there is sufficient ventilation, even when the ParCho is fully closed up. In warmer, less-windy conditions, reduce clothing and *progressively* open up. First, open bottom hem drawcord; then loosen the Hood's chin and front drawcards; open zipper as much as needed; remove hood; remove hands from ParCho arms; and ultimately, hold open the front with your hands. In warm rains, stay dry and comfortable by removing excess clothing under ParCho, all the way down to shoes and shorts when hot.

**Stuff Sack & Pillow:** Either one, turn it inside out before stuffing in the ParCho; for the pillow add other clothing to make the pillow fluffier.

## Rain Pants

Simple rain pants that can easily be pulled over clothes and shoes are recommended. When made out of silnylon they weigh only ~3 oz. and easily store inside the ParCho stuff sack, which makes them handy to slip on and off as needed (stuff sack will hold both rain pants and ParCho). One good pattern is the generously sized Rain Shed RS500, Pullover Pants (requires about 1 to 2 yards of silnylon and 1.25 yards of 1" elastic). Generally, wear rain pants with cuffs fully open to allow a little ventilation and minimize moisture build-up. (Velcro closures for the cuffs might be useful in snow, or when you're inactive in extremely cold weather; but, they are not really useful in 3-season hiking conditions.)

When you are cold in the rain, wear wind pants or long-johns underneath the rain pants. When you are hot in the rain, simply remove rain pants and hike in shorts underneath your ParCho.

Happy Hiking!

*Bilgy* Bill Gurwell