

Our goal is to create uniform, rectangular, flat plastic bundles, each measuring 40" x 48" (the dimensions of a standard wooden pallet), and weighing approximately 50 pounds (60 pounds maximum). Keep this end goal in mind as you work. Try to be careful and stay within the dimensions, so we can stack the bundles neatly and tightly cover them with tarps or pallet bags. Be mindful of the 50-pound weight, so we can move the bundles by hand when necessary.

Step 1: Estimate the number of 50-pound bundles per structure

Use the following formula:

$$\text{structure width}^* \times \text{structure length}^* \times 1.5 \text{ (factor for height and curvature of structure)} \times \text{layers of plastic} = \text{total square feet of plastic}$$

$$\text{total square feet of plastic} \times \text{weight of plastic (lbs/sq ft)} = \text{total weight}$$

$$\text{total weight} \div 50 \text{ pounds} = \text{bundles per structure}$$

The manufacturer or supplier will usually list the weight of the plastic as lbs/sq ft. If the weight is unknown, use the following values:

3-4 mil over-wintering film = 0.03 lbs/sq ft

6 mil greenhouse film (standard) = 0.04 lbs/sq ft

9 mil heavy greenhouse film = 0.08 lbs/sq ft

For plastic end walls, use the following formula to estimate the combined weight of both end walls:

$$\text{structure height}^* \times \text{structure width}^* \times \text{layers of plastic} \times \text{weight of plastic (lbs/sq ft)} = \text{estimated weight for combined end walls}$$

* All structure measurements are in feet

Calculation example:

Assume a 30' x 100' high tunnel with a double layer of 6 mil plastic and 13' high plastic-covered end walls.

Top cover:

$$30 \text{ ft} \times 100 \text{ ft} \times 1.5 \times 2 \text{ layers} = 9,000 \text{ sq ft}$$

$$9,000 \text{ sq ft} \times 0.04 \text{ lbs/sqft} = 360 \text{ lbs for top cover}$$

$$360 \text{ lbs} \div 50 \text{ lbs/bundle} = 7.2 \text{ bundles for top cover plastic}$$

End walls:

$$13 \text{ ft} \times 30 \text{ ft} \times 2 \text{ layers} \times 0.04 \text{ lbs/sq ft} = 31.2 \text{ lbs for both end walls (15.6 lbs for each wall)}$$

$$31.2 \text{ lbs divided by } 50 \text{ lbs/bundle} = 0.62 \text{ bundles}$$

Total bundles:

$$7.2 \text{ bundles} + 0.62 \text{ bundles} = 7.82 \text{ bundles (~8 bundles)}$$

OR

$$360 \text{ lbs} + 31.2 \text{ lbs} = 391.2 \text{ lbs} \rightarrow \div 50 \text{ lbs} = 7.82 \text{ bundles (~8 bundles)}$$

Step 2: Decide on dimensions for cuts

Make a simple plan on how to best cut your plastic into the estimated number of bundles needed based on your unique greenhouse configuration, type of fasteners (e.g. wiggle wire vs. wooden hip boards with battens), and whether you plan to cut the plastic on the ground or make some cuts while the plastic is still attached to the frame.

For example, assume the high tunnel described in Step 1 has a 4' knee wall. Multiply the 4' knee wall x the 100' length x 2 layers of plastic x 0.04 lbs/sq ft = 32 lbs of plastic for each knee wall. Therefore, one bundle could be made from one knee wall @ 32 lbs plus one end wall @ 15.6 lbs = 47.6 lbs. Repeat for the other knee wall and end wall to create the second bundle.

The remaining double top sheet weighs 297.4 lbs after subtracting the knee walls and end walls. We need six more bundles. To create six bundles, you could either cut both top sheets together on the ground into six equal pieces, or pull off each sheet separately and cut each piece into thirds.

An alternative method could be to pull both top layers off in their entirety and cut them into seven equal rectangles on the ground (by width or length) for seven bundles. Each of the seven bundles would weigh 51.4 lbs (360 lbs divided by seven) The eighth bundle would consist of both end walls combined into a one small bundle weighing 31.2 lbs.

These examples illustrate that there are multiple ways to cut up your plastic to create the required number of bundles by weight. Remember bundles should approximate 50 pounds, with a 60-pound maximum.

Step 3: Cutting

Pick a relatively calm and dry day to cut plastic.

Keep plastic free from unnecessary contamination while it is on the ground being cut and folded (e.g. freshly mowed grass, mud, etc.)

Use a utility knife to cut the plastic into pieces based on the plan developed in Step 2.

Cut off and discard any plastic that is heavily contaminated with algae and dirt, for example along the roll up bars or the top of the hip board attachments. Make the cut about one-two inches above the contaminated area.

Step 4: Folding

Using a standard 40" x 48" wooden pallet as a template, fold your piece of plastic into a flat rectangle of the same or slightly smaller dimension. The plastic tends to spread as you fold it, so aiming for slightly smaller is better. When dropped off, all plastic will be stacked neatly on 40" x 48" pallets with room to pull a pallet cover down over the top. Neatness counts!

Step 5: Labeling

Use a waterproof permanent marker to label each bundle with your contact name for registration and number each bundle sequentially for each registered drop-off. (e.g. 1 of 7, 2 of 7, 3 of 7, ...). If you are dropping off plastic from more than one structure, all bundles from all structures should be in the sequential total. For example, if you are dropping off plastic from two high tunnels with a total of four bundles from each tunnel, you would label them 1 of 8, 2 of 8, etc.

Step 6: Securing and storing bundles

Store your bundles in a dry location until you drop them off, so they do not collect rainwater, snow or ice.

Please **do not** tie your individual bundles. If you fold your bundles tightly and weight them down (an extra pallet is an ideal weight), there is no need to secure your individual bundles. If you need to secure your bundles to protect them from wind, please use baling twine that we can easily cut and remove at the end of the collection season.

Step 7: Registering your bundles for drop-off

Please pre-register your bundles before you drop them off, as described on our website: extension.umaine.edu/agriculture/greenhouse-plastic-recycling/gpr-bundle-registration.