

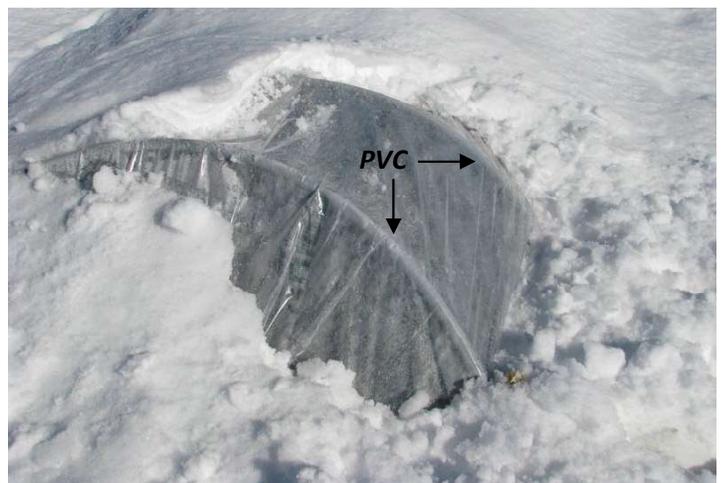
Overview:

Congratulations on your purchase of the Quick Hoops™ Bender! Hoophouse style protection at a much lower cost! Extend the growing season for cold-hardy crops with a very late season harvest or overwinter them for earliest possible Spring harvest.



Three rows of Quick Hoops™ covering the same area as a 22 x 48 ft. greenhouse at 1/20th the cost!

The pictures below show low tunnels made of ½" plastic PVC pipe that have collapsed from the weight of snow. Our benders have been designed to quickly create low tunnel hoops out of **galvanized electrical conduit (a.k.a: electromechanical tubing, or EMT)** to withstand brutal fall winds and heavy winter snow loads.



February 2008, PVC hoops trial at Four Season Farm, Harborside, ME.

$\frac{1}{2}$ " **EMT conduit** is recommended for most applications, and can be purchased at your local home improvement store or electrical supply house for about \$2 per 10 ft length.

These benders will also bend $\frac{3}{4}$ " or 1" conduit, which can be useful to provide extra strength for tunnel ends, or for fabricating small seed starting chambers and mini greenhouses. The Quick Hoops™ Benders come in 4- or 6-ft diameter configurations, so Quick Hoops™ can span one or two beds at a time (as shown below).



When frost is expected, Quick Hoops™ are installed over the beds by inserting them into the soil about 10" and then covered with spun-bonded row cover; see below for Agribon brand, in varying frost protection levels and lengths; 10 - 15 ft widths are recommended.

When real winter threatens, row cover is topped with UV resistant Tufflite Nursery Clear polyethylene greenhouse film. Covers are usually secured with sand bags or some other type of weight placed at the edge of each hoop.

Contents:

- Curved bender
- Lever bar (for "finishing" the bend) with removable inserts installed, to accommodate $\frac{1}{2}$ ", $\frac{3}{4}$ " or 1" electrical conduit (EMT)
- Two $\frac{1}{4}$ " x 5" lag screws for mounting to wood surfaces and two $\frac{1}{4}$ " x 4- $\frac{1}{2}$ " carriage bolts, nuts, and washers for mounting to metal surfaces
- Detailed instructions



Mounting:

Quick Hoops™ Benders may be mounted to any solid surface, such as the corner of a shop workbench, a picnic table, hay wagon, etc. It may be lag-screwed or thru-bolted into place. There are two 5/16" mounting holes benders for 1/4" lag screws, bolts, etc. that are also included. By securing the bender in a fixed position, and pulling the tubing around the bender, the operator can maintain precise control of the tubing being bent.



Optionally, it can be mounted to your farm truck's hitch receiver using our **#9852 Bender Hitch Mount**, for convenience and portability. This provides an extremely sturdy base at an ergonomic working height for either Quick Hoops™ Bender, allowing you to fill your truck with conduit and bend hoops easily and conveniently, right there in the field. Fits any standard 2" trailer hitch receiver.



Operation:

1. **Mount your Quick Hoops™ Bender** securely as shown above or to any flat work surface that is stable and will not move. Ensure there is adequate room on either end of the bender for the tubing to be inserted and slide through.
2. **Prepare the lever bar (included only with the 6 ft bender 9520).** The end of the lever bar with two tech screws is used to accommodate 1/2" or 3/4" thin-wall electrical conduit (EMT) tubing. This end of the lever bar arrives ready to bend 1/2" EMT. As you bend the tubing and approach the end of the tube, you will need extra leverage.
 - a. **For 1/2" EMT**, simply slide this end of the lever bar over the tubing until it contacts the first set screw, then finish the bend as shown in later illustrations.



- b. **For ¾" EMT**, back out the first set screw as shown and remove the innermost insert. Then slide the lever bar over the tubing until it contacts the second set screw, and finish bending.
- c. **For 1" EMT**, simply turn the lever bar around, slide the lever bar over the first four or five inches of the 1" EMT and finish the bend.



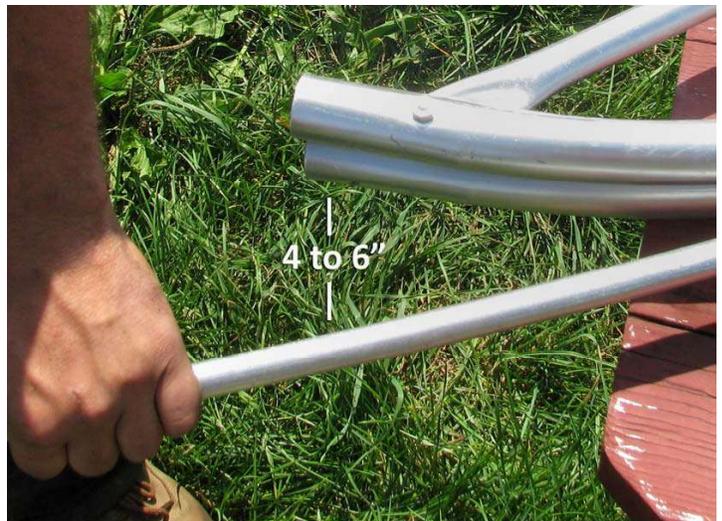
The lever bar and inserts are the only parts that will wear and need to be replaced in time. Don't worry. They will produce many hoops before that ever occurs. The lever bar is made entirely from stock tubing sizes available at most hardware stores, and is easily maintained by the user. Complete replacement lever bars may also be purchased later on.

3. Bending the tubing.

- a. **If you have the 9520 Quick Hoops™ Bender for 6 ft. diameters...** from 10 ft. long EMT, you can create 6 ft. wide hoops, 3 ft tall (before insertion into the ground), that will easily span two 30" beds with a footpath between.
 - i. Insert a 10 ft. length of EMT into the holding strap, so it is even with end of the bender as shown. The operator stands at the end of the bender indicated in the photo below right.



- ii. **On the first bending stroke**, pull the tubing towards you around the bender, **bending all the way around** until the tubing touches the operator's end of the bender.
- iii. Release pressure on the tubing and **push only about half** of the portion you just bent through the holding strap to make the next bending stroke. It is important to not push any more than ½ the bent length through at a time, in order to maintain a smooth, consistent radius. At this point, vertical support of the bent end coming out of the bender is also needed, either by a helper or outfeed table, in order to keep the hoop in a single flat plane, so it will not corkscrew or twist.
- iv. **For subsequent bending strokes**, stop the bending stroke **4-6"** before the tubing reaches the operator's end of the bender.



- v. Continue with the above procedure, pushing $\frac{1}{2}$ through and bending to 4-6" from the operator end of the bender, until you near the end of the tubing being bent. At this point, employ the **lever bar for the final bend** by inserting over the end of the tubing and positioning the tubing so that end of the lever bar will just miss the end of the bender. Then, use the lever bar to finish the bend. This time however, **bend all the way around** until the tubing touches the operator's end of the bender.



- vi. Slide the tubing out, and you have completed a 6 ft. hoop!



- b. **If you have the 9377 Quick Hoops™ Bender for 4 ft. diameters...**from 10 ft. long EMT, you can create 4 ft. wide hoops, roughly 4 ft tall (before insertion into the ground), that will easily span a single 36" wide bed.

- i. Insert a 10 ft. length of EMT into the holding strap so it **extends 16" beyond the end of the bender** as shown. The operator stands at the end of the bender indicated below.



- ii. **On the first bending stroke**, pull the tubing towards you around the bender, **bending all the way around** until the tubing touches the operator's end of the bender.



- iii. Remove the tubing and repeat steps i. and ii. above for the opposite end of the tubing.



- iv. With each end of the tubing now pre-bent, slide the tubing through the holding strap until the mid-point of the tubing is aligned with the middle assembly screw of the bender.
- v. With one hand on one end of the tubing and one on the other, squeeze the tubing together around the form, momentarily creating a horseshoe shape, so that when allowed to spring back, the ends of the tubing are visually parallel.
- vi. Remove from the tubing from the bender and manually adjust if necessary until the sides of the hoop are parallel and pointing straight down as shown below. You have just completed a 4 ft. hoop!



- c. **Truly Quick Hoops™!** After just a few tries, you will find that you will be able to complete individual hoops in less than a minute each.

Some thoughts:

Not all tubing is manufactured with the exact same base alloys or wall thicknesses. Therefore, if using tubing from two different sources, you may notice a difference in finished hoop widths. Hoops can easily be made uniform by compressing them inward or expanding them outward, using your foot and hands as shown here.

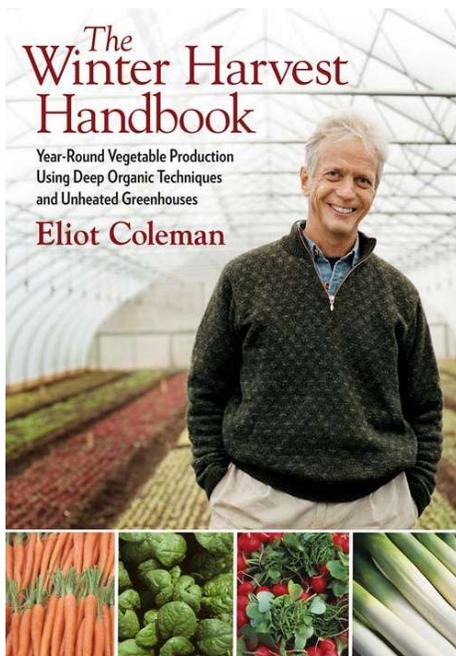
Also, along those same lines, you will find that when bending larger diameter pipes, you will not have to bend as close to the bender (stay more on the 6" end of the 4-6" guidelines above) to achieve the same radius bend, as these larger diameters have better shape memory and less elasticity. Some practice and trial and error will inevitably result in perfecting your technique.



Use in the field:

Quick Hoops™ are generally driven about 10" into the ground and spaced 5 to 6 ft. apart. You may find it helpful to use a digging bar to prepare holes to accept the tubing, if your soil is not very loose or is rocky. Cover with Agribon spun-bonded row cover and eventually top with greenhouse film for overwinter protection. Please see the following page for ordering information.

A great deal of information on the use and implementation of the Quick Hoops™ growing system, including suggested varieties and planting dates can be found in Eliot Coleman's newest book:



9698 The Winter Harvest Handbook.

A comprehensive handbook for raising crops throughout the winter. Choosing locally grown organic food is a sustainable living trend that has taken hold throughout North America. Celebrated farming expert Eliot Coleman helped start this movement with *The New Organic Grower* published 20 years ago. He continues to lead the way, pushing the limits of the harvest season while working his world-renowned organic farm in Harborside, Maine. With *The Winter Harvest Handbook*, anyone can have access to his hard-won experience. Coleman offers clear, concise details on greenhouse construction and maintenance, planting schedules, crop management, harvesting practices, and even marketing methods in this complete, meticulous, and illustrated guide. His painstaking research and experimentation with more than 30 different crops will be valuable to small farmers, homesteaders, and experienced home gardeners who seek to expand their production seasons.

Materials and their uses:

In early Spring, Quick Hoops™ can be covered with AGRIBON+ AG-19 spun-bonded row cover to protect crops from both frost and insect damage.

In Summer, Quick Hoops™ can be covered with AGRIBON+ AG-15 spun-bonded row cover as an insect barrier or knitted shade cloth to reduce heat and light intensity for sensitive crops.

When frost is expected, Quick Hoops™ can be used to extend the season by covering with AGRIBON+ AG-19 or heavier spun-bonded row covers.

When real winter threatens, the row cover is then topped with UV resistant *Tufflite Nursery Clear* greenhouse film to allow very late harvest, over-wintering, or earliest possible spring germination. The plastic film is usually secured with sand bags or some other type of weight placed at the edge of each hoop to prevent tearing.

Coverings in general can be held down by a variety of methods, including (but not limited to) sandbags (available at www.uline.com, among other sources), snap clamps, heavy duty row cover hand pegs, rocks, or a dug trench along the edge of the hoops to bury the edges of the cover.

Agribon+ Spun-Bonded Row Cover



AG-15: *Lightweight grade for insect control. 90% light transmission. 0.45 oz./sq.yd.*

9057 AG-15 ROW COVER – 118" x 50' roll

9051 AG-15 ROW COVER – 118" x 250' roll

9050 AG-15 ROW COVER – 118" x 1500' roll

AG-19: *Standard grade for general frost protection. Frost protection down to 28°F. 85% light transmission. 0.55 oz./sq.yd.*

9065 AG-19 ROW COVER - 10' x 50' roll

9066 AG-19 ROW COVER - 10' x 250' roll

9544 AG-19 ROW COVER - 10' x 500' roll

9545 AG-19 ROW COVER - 10' x 1000' roll

AG-30: *Overwintering protection in moderate climates. Frost protection down to 26°F. 70% light transmission. 0.9 oz./sq.yd.*

9563 AG-30 ROW COVER - 14' x 800' roll

AG-50: *Overwintering protection in colder climates. Frost protection down to 24°F. 50% light transmission. 1.5 oz./sq.yd.*

9605 AG-50 ROW COVER - 10' x 500' roll

9611 AG-50 ROW COVER - 10' x 1500' roll

AG-70: *Heaviest overwintering and freeze protection. Frost protection down to 24°F and below. 30% light transmission. 2.0 oz./sq.yd.*

9628 AG-70 ROW COVER - 13' x 100' roll

9639 AG-70 ROW COVER - 13' x 300' roll

Clear Polyethylene Greenhouse Film

The preferred winter covering for Quick Hoops™. UV resistant and ultra clear, this 4 mil, high-quality, high-tech film designed specifically for greenhouses is perfect for use with low tunnels. Unlike construction grade poly which yellows quickly, it provides optimum light transmission and resists yellowing. Extremely durable for long winters.

**9464 TUFFLITE™ 'NURSERY CLEAR'
GREENHOUSE FILM - 10' x 100' roll**



Knitted Shade Cloth

Reduces heat and light intensity, resulting in better quality and higher yields for crops like peppers and eggplant; speeds growth of cool weather fall crops, prevents bolting and bitterness of heat-sensitive crops (such as lettuce and spinach); and protects against wind damage and desiccation. 100% UV stabilized black polyethylene; naturally rot and mildew proof. This lock-stitch knitted shade cloth is lighter weight, and has better ventilation and water permeation than woven shade cloth, and can be cut without unraveling. 5-7 year lifespan. Can reduce ambient temperature by 10 deg F or more. Must hang high enough above plants and provide adequate side ventilation to prevent heat build up. 10' width is used over Quick Hoops™ low tunnels, with the sides uncovered for maximum ventilation; and secures easily with Snap Clamps (see below). Guidelines: For solonaceous crops such as tomatoes and peppers, use 30% shade cloth in areas with very hot summers; for cold-loving lettuce, spinach and cole crops, use 50% in hot, southern areas, 30% in northern zones. For shade-loving plants, use 50%.



Density equals percent light blocked.
30% cloth allows 70% light transmission, etc.

**9558 KNITTED BLACK SHADE CLOTH – 30%
shade; 10' x 100' roll**

**9570 KNITTED BLACK SHADE CLOTH – 50%
shade; 10' x 100' roll**

Row Cover Hand Pegs

Extra row cover holding power for low tunnels. Holds row cover firmly in place, even in the



strongest winds. For best performance, place at the base of hoop support with the long prong puncturing just inside the rolled edge of the row cover, with one small barb through the fabric and the other directly into the soil.

9151 Pkg of 25

9814 Case of 250

Snap Clamps

Quickly fasten greenhouse plastic, row cover, or shade cloth to Quick Hoops™ and other low tunnels made of electrical conduit (EMT) or plastic (PVC) pipe. Space clamps about 1' apart or closer in windy situations. UV stabilized and frost resistant for years of dependable use. Packages of 10.

9608 For 1/2" EMT only.

**9150 For either 3/4" EMT
or 1/2" PVC.**



Over-Winter Set Up:

Extra care must be taken to prepare Quick Hoops™ for service through the winter. Once a bed is planted, Quick Hoops™ made of ½” EMT are generally placed at intervals of five feet and driven 8-10” into the ground. If your soil is dense or rocky, you may find the use of a digging bar to “pre-drill” holes for the hoops helpful. If you are using 10 x 100’ greenhouse film, you will want the tunnels to be no more than 85 ft long from end hoop to end hoop (18 hoops total), in order to allow for enough excess material at each end. It is important to note that longer tunnels will have a lower surface area to volume ratio and will be on average effectively warmer overall for the crops within them.



A good solid stake of some kind should be placed at each end at about a 45 degree angle pointing away from the tunnel; wood is preferable over rebar, unless driven very deep, because rebar will slice through wet soil and often pull out in wet spring storms.

For extra support and to prevent crops from being crushed, we add a cord or rope from the top of each end hoop down to the neighboring stake as shown above. In our experience, the EMT hoops will not bend under snow load, but due to their thin nature, they will (like the rebar) slice through the soil when under load, particularly the end hoops, which carry the load of the entire tunnel.

Fill sand bags with sand or rocks, not soil. Soil will dry out and the bags will become too light to function properly, especially in high wind.

Spread the row cover over the hoops; 10 to 15 ft wide is ideal. Do not cut to length yet. Bunch up the end that is opposite to the roll and tie it off to the stake nearest it. Return to the opposite end. Pull the row cover tight lengthwise, with the logo lettering in the top center of the hoops – not because it looks good, but because it indicates the center, and you will have equal overlap on each side for sand bags to sit on.





While pulling it tight lengthwise, hold it just past the stake on that end and neatly gather each side of the fabric to the stake, then tie that end off and cut the fabric to length.

Add sand bags at the base of each hoop and on each side between the end hoop and end stake. Soil may also be added intermittently between hoops to prevent wind from catching fabric.

Keep this covering on until “real winter” threatens, then add plastic right on top of the row cover by repeating the same procedure.

Bunch together and tie to the stake (separately from the row cover). If you were to untie the row cover, bunch them together, then tie them, the coverings will slip over each other in the not and become loose, causing the tunnel to collect snow rather than shed it.

Repeat for the other end, centering the plastic, and pulling it as tightly as possible lengthwise, before tying.

Cut to length. Then add sand bags. The side bags should be on top of both coverings, against the hoops.



Side bags



End hoop bags



A little breezy area at the end is easily sealed up.

Storm preparation tips: Difficulties in keeping coverings on are generally encountered during late fall or early spring storms. Once snowfall occurs, there will be added weight to hold down the plastic and the tunnels should be maintenance free until the snow melts.



If you have an unprotected field that tends to catch a lot of wind, 1" x 1" grade stakes may be added to allow lacing in a criss-cross pattern over of the plastic (see upper right). This should enable the tunnels to weather most tough storms without previously having accumulated snow. You may find it necessary (as we did in our trials) to only add this to a portion of the tunnels furthest from the tree line. **Good luck!**

