QuickHoops™ Low Tunnel Bender Instruction Manual

7030 E 46th Avenue Dr, Denver, CO 80216, United States
support@hensleyseeds.com | hensleyseeds.com

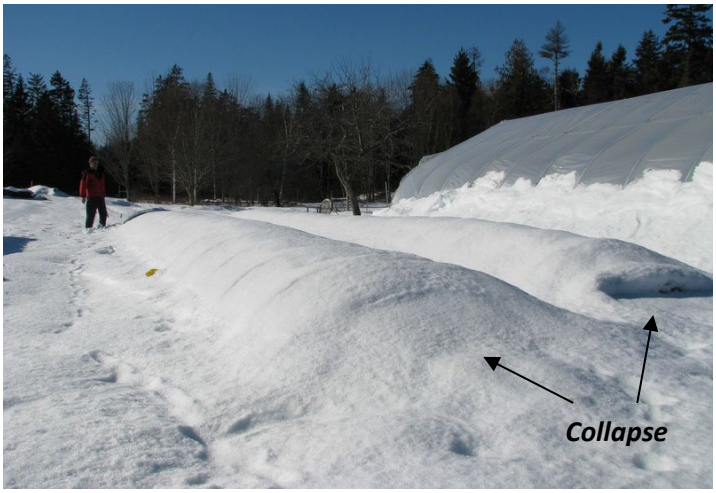
The QuickHoops™ Low Tunnel Benders provide hoophouse-style protection at a much lower cost. Extend the growing season for cold-hardy crops with a very late season harvest or overwinter them for earliest possible spring harvest.

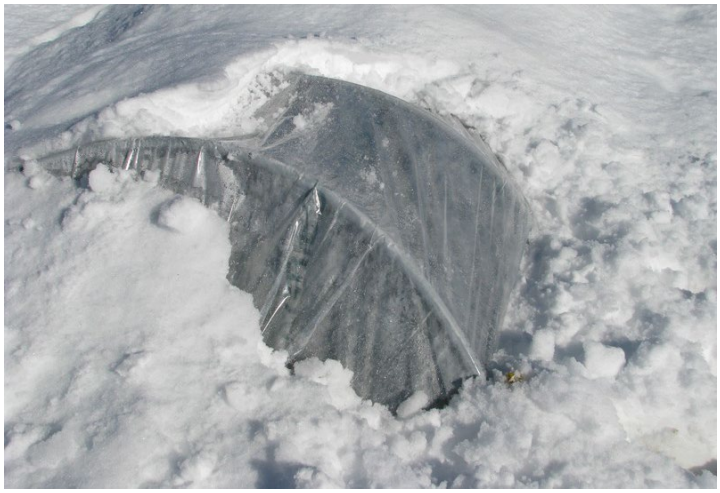
NOTE: These instructions apply to the 4' Low Tunnel Hoop Bender and 6' Low Tunnel Hoop Bender . For instructions pertaining to the 3' Low Tunnel Hoop Bender, see Instruction Manual .999.



Three rows of QuickHoops Low Tunnels, covering the same area as a 22x48 ft^2 greenhouse at 1/20th the cost.

The photographs below show low tunnels made of ½" diameter PVC pipe that have collapsed from the weight of snow. Our benders are designed to quickly create low tunnel hoops out of galvanized electrical conduit (electric metallic tubing, or EMT) to withstand brutal winds and heavy snow loads.





½" diameter EMT conduit is recommended for most applications and can be purchased at your local home improvement store or electrical supply house in the 10’ lengths needed to construct the low tunnels.

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These benders can also bend ¾" or 1" EMT conduit, which can be useful for providing extra strength for tunnel ends or fabricating small seed-starting chambers and mini greenhouses. The low tunnel benders are available for 3'-, 4'-, and 6'-diameter configurations so that low tunnels fabricated from them can span one or two beds at a time.



Hoops made with the 6-foot diameter bender covering 2 beds



Materials Included

(1) Curved Bender
(2) ¼" x 5" lag screws for mounting to wood surfaces
(2) ¼" x 4½" carriage bolts, nuts, and washers for mounting to metal surfaces

only

(1) Lever Bar — included only with the 6' Low Tunnel Hoop Bender. The lever bar enables the operator to gain the mechanical advantage needed to bend hoops over the low-profile bender.

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MOUNTING

QuickHoops Benders can be mounted to any solid surface, such as the corner of a shop workbench, a picnic table, or hay wagon. It can be lag-screwed or through-bolted into place. There are two $^{5}/_{16}$" mounting holes in the benders for the ¼" lag screws or bolts that are included. By securing the bender in a fixed position and pulling the conduit around the bender, the operator can maintain precise control of the conduit being bent.





Optionally, the bender can be mounted to a trailer hitch receiver using our **Hoop Bender Hitch Mount, for convenience** portability. The mount fits any standard 2" trailer hitch receiver and allows you to fill your vehicle with conduit and bend hoops right in the field.



OPERATION

1. **Mount your QuickHoops Bender** securely 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 conduit to be inserted and slid through.

2. **Prepare the lever bar (included only with 6' Bender).** The end of the lever bar with 2 tek screws is used to accommodate ½" or ¾" thin-wall EMT. This end of the lever bar arrives ready to bend ½" EMT. As you bend the conduit and approach the end, you will need extra leverage.



   a. **For ½" EMT**, simply slide this end of the lever bar over the conduit 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 conduit 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 4–5" of the 1" EMT and finish the bend.

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The lever bar and inserts are the only parts that will wear and need to be replaced in time. The lever bar is made entirely from stock conduit sizes available at most hardware stores and is easily maintained by the user. A complete replacement lever bar can also be purchased when needed.

3. Bending the conduit.

a. **For the QuickHoops Bender for 6' diameters:** From 10'-long EMT, you can create 6'-wide hoops, 3'-tall (before insertion into the ground), that will easily span two 30"-wide beds with a footpath in between.

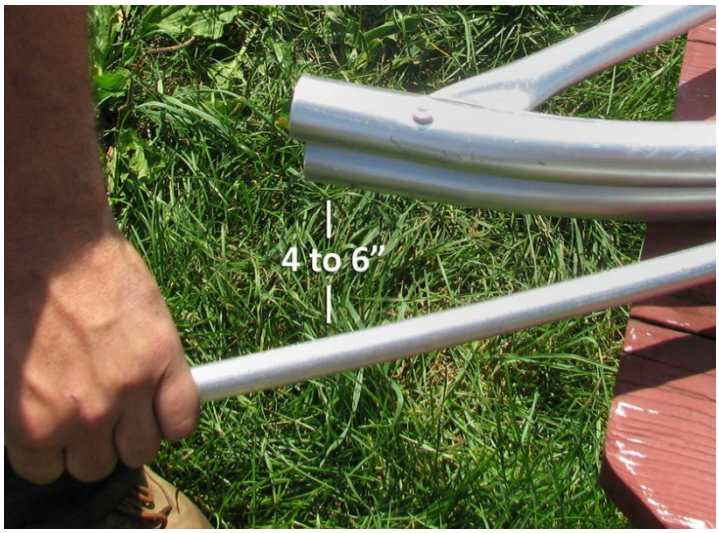
i. Insert a 10' length of EMT into the holding strap **so it is even with the end of the bender,** as shown below right. The operator stands at the end of the bender indicated below left.





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

iii. Release pressure on the conduit and **push only about half** of the portion you just bent through the holding strap to make the next bending stroke. It is important not to push any more than half the bent length through at a time to maintain a smooth, consistent arc. At this point, support of the bent end coming out of the bender is also needed, either by a helper or outfeed table, 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 conduit reaches the operator's end of the bender.

v. **Continue** with the above procedure, pushing half through and bending to 4–6" from the operator end of the bender, until you near the end of the conduit being bent. At this point, employ the lever bar for the final bend by inserting over the end of the conduit and positioning the conduit 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 conduit touches the operator's end of the bender.

vi. **Slide** the conduit out, and you have completed a 6' hoop.

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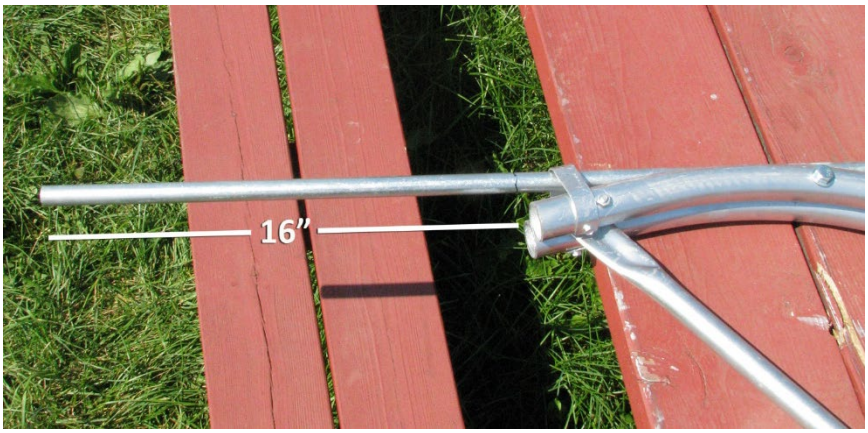




b. **For the QuickHoops Bender for 4' diameters:** From 10'-long EMT, you can create 4'-wide hoops, roughly 4' tall (before insertion into the ground), that will easily span a single 36"-wide bed.

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





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





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

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iv. With each end of the conduit now pre-bent, slide the conduit through the holding strap until the midpoint of the conduit is aligned with the middle assembly screw of the bender.

v. With one hand on one end of the conduit and one on the other, squeeze the conduit together around the form, momentarily creating a horseshoe shape, so that when allowed to spring back, the ends of the conduit are visually parallel.

vi. Remove the conduit 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' hoop.





After just a few repetitions, you will find that you will be able to complete individual hoops in less than a minute apiece.

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Conduit Considerations



Not all conduit is manufactured with the exact same base alloys or wall thicknesses. If using conduit 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.

When bending larger diameter conduit, 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 larger diameters have better shape memory and less elasticity.

Use in the field

QuickHoops Low Tunnels are generally driven about 10" into the ground and spaced 5–6' apart. You may find it helpful to use a digging bar to prepare holes to accept the conduit if your soil is rocky or not very loose. Cover with row cover and top with greenhouse film for overwinter protection.

A great deal of information on the use and implementation of the QuickHoops Low Tunnel growing system, including suggested varieties and planting dates, can be found in Eliot Coleman's ***The Winter Harvest Handbook*.**

Materials and their applications for crop protection

In early spring, cover with Agribron+ AG-19 row cover to protect crops from both frost and insect damage.

In summer, cover with Agribon+ AG-15 row cover or ProtekNet as an insect barrier and knitted shade cloth to reduce heat and light intensity for sensitive crops.

When frost is expected, extend the season by covering with Agribon+ AG-19 or heavier row covers.

When winter weather is expected, top the row cover with UV-resistant Tufflite Nursery Clear greenhouse film to allow very late harvest, overwintering, or spring germination. The plastic film is usually secured with sandbags 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 sandbags, 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.

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ProtekNet: Use for insect control. 89% light transmission, 62% porosity. 0.74 oz/sq.yd.

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

AG-19: Standard grade for general frost protection. Frost protection down to 28°F (-2°C). 85% light transmission. 0.55 oz./sq.yd.

AG-30: Overwintering protection in moderate climates. Frost protection down to 26°F (-3°C). 70% light transmission. 0.9 oz./sq.yd.

AG-50: Overwintering protection in colder climates. Frost protection down to 24°F (-4°C). 50% light transmission. 1.5 oz./sq.yd.

AG-70: Heaviest overwintering and freeze protection. Frost protection down to 24°F (-4°C) and below. 30% light transmission. 2.0 oz./sq.yd.



Tufflite Nursery Clear — Greenhouse Film

UV-resistant and ultra-clear, this 4.0 mil film is designed specifically for greenhouses is also perfect for use with low tunnels. Provides optimum light transmission and resists yellowing. Extremely durable for long winters.

Knitted Shade Cloth

Reduces heat and light intensity, resulting in better quality and higher yields for crops; speeds growth of cool weather fall crops, prevents bolting and bitterness of heat-sensitive crops; 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°F or more. Must hang high enough above plants and provide adequate side ventilation to prevent heat build-up. 10' width is used over low tunnels, with the sides uncovered for maximum ventilation, and secures easily with Snap Clamps (see below).



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Row Cover Hand Pegs
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.



Snap Clamps
Quickly fasten greenhouse plastic, row cover, or shade cloth to QuickHoops Low Tunnels and other low tunnels made of EMT or PVC pipe. Space clamps about 1' apart or closer in windy situations. UV-stabilized and frost-resistant for years of dependable use.



Overwinter set-up

Extra care must be taken to prepare Quick Hoops Low Tunnels for service through the winter. Once a bed is planted, low tunnels made of ½" EMT are generally placed at 5' intervals and driven 8–10" into the ground. If your soil is dense or rocky, you may find the use of a digging bar to “predrill” 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' long from end hoop to end hoop (18 hoops total), 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 warmer.



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

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Fill sandbags 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; 10–15’ 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 — it indicates the center, and you will have equal overlap on each side for sandbags 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 sandbags 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 the fabric.

As winter approaches, add plastic on top of the row cover by repeating the same procedure. Bunch the ends together and tie them to the stakes separately from the row cover. (If you were to untie the row cover, bunch and tie the two together, the coverings would slip over each other in the knot 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 sandbags. The side bags should be on top of both coverings, against the hoops.

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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 can be added to allow lacing in a crisscross pattern over the plastic (see upper right). This should enable the tunnels to weather most tough storms without having previously accumulated snow.





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