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A Different Kind of Windscreen

Build Your Own KiteScreen

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Special Note: This article describes the construction of a backpacking stove windscreen that uses materials that can melt or ignite if exposed directly to a flame. I believe the design of this windscreen to be quite safe, however, as long as common sense precautions are observed. Please be sure to read the Safety Considerations section below before building your own KiteScreen. Jim Wood.

I've got to say this right up front: I really don't care for the aluminum windscreens that most of us use with our backpacking stoves. I'm quite certain, in fact, that I'd place them near the top of my "Most Annoying Pieces of Backpacking Equipment" list, even ahead of continuous-clog water filters. In many cases, however, they're a necessary evil since without them, it's often difficult, or perhaps impossible, to use a stove for even the most fundamental tasks such as boiling water.

The nuisance factor escalated many years ago when I switched from white gas to top-mounted canister stoves for most three-season backpacking trips. Unfortunately, not a single canister stove manufacturer of which I'm aware recommends the use of a windscreen with their products (I'm excluding the Jetboil and MSR Reactor systems, which include integrated wind barriers). Most, in fact, actively warn against it, citing concerns about the potential for reflected heat to cause canister explosions.

Some enterprising backpackers have developed work-around windscreens for top-mounted canister stoves, but they are mostly, in my opinion, pretty kludgey. I'd even put my own design, which is pictured below, into that category.

Most require the installation of a some kind of horizontal heat reflector located above the canister that also serves as a support platform for the vertically-oriented windscreen component. The mechanisms for reflector attachments are highly non-standard, however, and are entirely dependent upon the design characteristics of the stoves themselves. And even if one manages to find a way to attach such a windscreen, most designs I've seen appear to be fairly unstable (at least mine is), especially in the presence of robust winds.

In addition, most also can't be used with integrated piezoelectric spark lighters whose plastic components will often melt when subjected to the elevated temperatures inside the windscreen.

Jim's aluminum canister stove windscreen components (+)

Jim's aluminum windscreen attached to stove (+)

Other Problems

My issues with aluminum windscreens are not canister-specific, however. I find them annoying to use with almost any kind of stove for several reasons:

- Because they're not anchored to the ground, most windscreens can blow around in even moderate winds. If one side happens to get pushed too close to the stove's flame, a portion of the windscreen can melt.
- Most windscreens cover only part of the cook pot. As a result, some of the wind that strikes the pot from the sides is deflected downward towards the stove (inside the windscreen), causing turbulence in the flame below.
- Metal windscreens placed close enough to a stove to be really effective can get quite hot during operation, creating a burn hazard for the user. Because a pot's handle often ends up very near an edge of the windscreen, skin-to-windscreen contact is almost inevitable with some designs. Likewise, these hot windscreens are also great for melting the synthetic fabrics used in expensive outdoor clothing.
- Many windscreens, particularly those designed for use with alcohol stoves, must be populated with ventilation holes in order to provide pathways for oxygen to reach the stove's flame. These same holes, however, also allow the wind to create turbulence inside the combustion area, thereby reducing the stove's efficiency (sometimes by a lot).
- Most windscreens are optimized for a single pot size. If you want to use, a larger-than-normal vessel (perhaps a skillet for frying fish) many windscreens will fail to accommodate.
- Almost all conventional windscreens can be used with only one stove at a time. If you're cooking for a group using multiple stoves, each must have its own windscreen.
- And finally, metal windscreens are opaque, which makes it pretty much impossible—at least for screens that wrap completely around the stove— to observe the flame during operation.

Thankfully, mother nature works on our behalf in many parts of the world, since winds are often at their lowest levels in the early morning and the early evening, when we're mostly likely to be using our stoves. As a result, we can sometimes get by without a windscreen. For all those other times, however, I began looking for a better way.

A Different Approach

Having considered a wide range of possible solutions to the windscreen problem, I ultimately decided that the approach discussed below offered the most promise. Because the first prototype was made from a kind of Tyvek (#1443R) that's often used for building kites, and since it likewise employed lightweight wooden support spars also found in kites, the new design was dubbed the "KiteScreen".

The idea is very simple. Rather than using a small, aluminum wind barrier placed close to the stove, the KiteScreen employs a larger, fabric-based wind shade placed further away. Because of the increased distance from the heat source, the screen fabric doesn't necessarily need to be heat-resistant (though that quality is a plus), so almost any lightweight, wind-resistant material will work.

Once cut to the desired height and width, the screen can then be supported by a variety of vertical struts planted firmly into the ground. Possibilities include trekking poles, trees, aluminum arrow shafts, wooden dowels, short sections of aluminum tent poles, bamboo garden stakes, or even sticks from the forest floor. Erected as described below, the KiteScreen offers a number of advantages over traditional aluminum windscreens.

Tyvek KiteScreen supported with sticks from the forest (+)

Tyvek KiteScreen supported with wooden dowels (+)

ADVANTAGES

- Because it's anchored to the ground, the KiteScreen can't blow around like aluminum windscreens often do.
- Since the kinds of fabrics best used for the KiteScreen weigh far less than comparably sized sheets of aluminum, a fabric screen can be much larger without becoming weight-prohibitive. Height-wise, it can therefore shield not only the stove and a portion of the pot, but the entire cooking setup, with plenty of headroom to spare. The flame turbulence created by the wind that's reflected downward when it strikes the the cook pot is therefore eliminated.
- A fabric windscreen placed at least 6" to 8" from the stove will never get more than slightly warm itself, thereby eliminating the user burn hazard discussed above. Likewise, it could never reflect enough heat to create a problem for a butane/propane cartridge and is therefore safe to use with top-mounted canister stoves.
- No matter how the KiteScreen is configured, there will always be a sufficient volume of oxygen available within its perimeter to fuel a stove. The kind of ventilation holes necessary for many windscreens, especially those used with alcohol stoves, are therefore not necessary, eliminating another cause of flame turbulence.
- Pretty much any reasonably-sized pot can be used within the KiteScreen area.
- Because the KiteScreen can be constructed to any size desired, a single screen could easily be used for two or three stoves at a time (depending again, on how it's configured).
- If supported by materials already at hand (trekking poles, trees, sticks from the forest, etc.) a reasonably-sized KiteScreen can weigh 1 ounce or even less. By contrast, my aluminum canister windscreen, complete with all components, weighs about 4½ ounces.
- The KiteScreen, much like a tarp shelter, can be erected in many different ways, enabling it to adapt to a wide range of conditions.

The KiteScreen does, however, have a couple of disadvantages when compared with conventional aluminum

windscreens.

DISADVANTAGES

- The KiteScreen is not free-standing, so it can't be used on rocks, picnic table tops, or other very hard surfaces.
- The KiteScreen is strictly a wind shade and therefore will not reflect heat back onto a cook pot in the same way that a conventional metal windscreen can. Accordingly, there could be a small loss in fuel economy with some stoves.

Safety Considerations

I suspect that some people will have a negative reaction to the idea of mixing backpacking stoves with materials like silicone impregnated nylon, which is known to be flammable. In fact, all of the KiteScreen fabrics discussed here (even oven bags) will either burn or melt if exposed directly to a flame.

So the key to safety is obvious: just keep the screen fabric a safe distance away (at least 6" to 8") from the closest edge of the stove or pot. And when estimating this distance, be sure to take into account the inward deflection of the screen fabric that will occur as the wind pushes against it. The actual amount of deflection will depend mostly upon the distance between the support struts and the tension that's applied to the fabric when positioning the struts.

The good news is that because the KiteScreen can be practically constructed to a much greater height than can a conventional aluminum windscreen, there's actually no advantage (within limits) to placing the stove too close to the fabric. A 19" high KiteScreen, for example, will usually block the wind just as effectively from a distance of a foot or more away from the stove as it will from 6" away.

The KiteScreen's effectiveness as a wind barrier will also depend, however, upon wind conditions and setup configuration. The safety distance rule is probably most likely to be compromised if the KiteScreen is erected in such a way as to fully encircle the stove (as might be desirable in high winds).

You'll need to make sure, therefore, that when you design and cut your screen, that its length is adequate to maintain this margin of safety with all probable setup configurations (more on these points below).

A couple of other safety precautions to keep in mind:

STABILIZE YOUR STOVE

Having your stove tip over while in operation is never a good thing, whether using a windscreen or not. If it happens while using the KiteScreen however, there's a good chance that you'll ignite or melt the fabric, so it's especially important that your stove be placed on a stable footing.

If you're using a canister stove, I'd recommend adding a stabilizer base of either a commercial or do-it-yourself design. One of my previous articles, in fact, takes an in-depth look at three such alternatives. The Super Legs option is, I believe, probably the best choice for most people, especially since the design allows a stove to be easily staked to the ground for extra stability.
An extract from the Super Legs build instructions which discusses this stake-down technique is provided below.

From the Super Legs build instructions

Here' another trick if you really want to nail your canister down for extra stability.

Slip three hook-style tent stakes under the wrap, one next to each of the legs, then push them into the ground (shown here is a ¼ ounce titanium stake).

You'll find that the stove is now VERY difficult to knock over.

(+)

It's also possible to stake a canister stove to the ground without Super Legs as follows:

Step 1: Wrap a piece of parachute cord (40" to 45" long) twice around the base of the fuel canister just above the bottom lip.

Step 2: While holding the loose ends of the cord in one hand, slip 3 hook-style tent stakes under the wrap with the other. Now tie off the cord, preferably with a square knot, as tightly as possible.

Step 3: Slide the tent stakes, which are now under the wrap, around the rim of the canister so that they're evenly spaced. Finally, push the stakes all the way into the ground to anchor the stove.

Alternatively, rather than using parachute cord, the Velcro sport wrap that is both pictured above and described here offers an even better way to secure the tent stakes to the canister. These wraps are available in both commercial and do-it-yourself versions.

Neither of these methods is as stable as using the stakes in conjunction with Super Legs, but either should keep your stove from actually tipping over when loaded with a pot full of water.

Canister stabilizers (+)

Super Cat stove with stabilizer (+)

A solid footing is equally important for other kinds of stoves as well. Ultralight alcohol stoves, especially side-burners that support cook pots directly, are famously unstable when used on uneven ground. The use of a stabilizer stand, perhaps like the one designed for use with the Super Cat alcohol stove and shown above, would be a good idea.

KEEP YOUR STOVE WELL AWAY FROM YOUR SHELTER

Another safety tip is to always use your stove a safe distance from your shelter, particularly if the canopy is constructed from a flammable material like silnylon. I know this is old advice, but in a worst-case scenario, there could be a greater chance of a stove-induced fire spreading to your shelter if the KiteScreen first becomes involved.

Build Instructions

SCREEN MATERIALS

In addition to Tyvek (mentioned above), I've built prototypes from plastic garbage bags, hardware store poly-tarps, paint drop cloths, silicone impregnated nylon ("silnylon") and wind-resistant polyester.

Perhaps the lightest practical option today is Cuben fiber, an ultralight (<½ ounce per square yard) but rather expensive laminate sailcloth that's now showing up in a variety of backpacking applications.

Another material that's been mentioned in the feedback forum over the past couple of years is Nomex, a flame resistant fabric made by DuPont. First marketed in 1967, it's used to make protective clothing for firefighters, pilots and race car drivers. Nomex, however, is both heavy (relative to other materials discussed here) and expensive, so is probably overkill this application.

All factors considered, I think that the best material I've found so far is the polymer used to make oven bags of the type that are widely available in grocery stores. These bags, manufactured by Reynolds (pictured below) and others, are made from a combination of special heat-resistant nylons that will tolerate temperatures to 400°F or more without melting. And as a bonus, the material's transparency also enables you to observe precisely how your stove's flame is being affected by the wind— something that's not possible with most metal windscreen designs.

Reynolds nylon oven bags (+)

To build the KiteScreen that I now use the most (primarily with top-mounted canister stoves), I cut two Reynolds turkey-sized bags length-wise and taped them end-to-end (using 2" wide clear packaging tape) to create a screen that's 19" wide by 58" long. That screen (shown below), which is admittedly larger than many users will probably need, weighs of 1.1 ounces without supports.

Jim's oven bag KiteScreen (+)

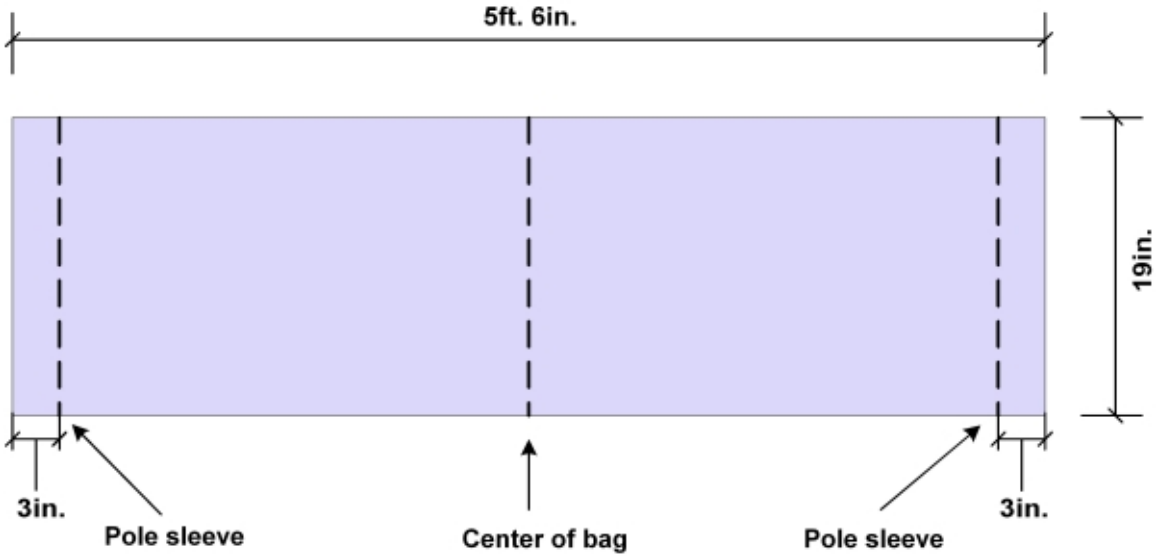
CONSTRUCTION

Whichever film or fabric you select, you might first want to build a couple of prototypes using "throwaway" materials to make sure that your screen dimensions will suit your needs. After some testing, you can then try your lighter or more durable "production" materials (see "Resources" below).

As you consider dimensions, I'd recommend that you set up your cooking outfit, measure the combined height of all components, then add at least 6" to that measurement to arrive at a starting height for your KiteScreen. A good initial length is 5½ to 6 feet. As you gain some experience, you can then adjust the dimensions as appropriate. One tip: while your screen is in use, you can simulate shorter heights by sliding the fabric down the supports (accordion-style), until you reach the desired test elevation.

Plastic garbage bags are an easy way to begin. I'd suggest using a bag that's at least 20" wide x 36" high x 1-to-2 mils thick (1 mil = .001 inch). To create the screen, first cut the bag along each side to a width of about 19". I should note that while this dimension works well for my stove outfit, it may be wider than you require. As noted above, however, you can always trim it later.

Next, open the bag at the bottom center, unfolding it to its full length. You'll want the finished length to be about 5½ feet long, so the unfinished length will need to be approx 6 feet to allow for a pole sleeve at each end. Finally, fold each end over about 3" and secure it along it's full 19" height using duct tape or similar adhesive in order to create a pole sleeve. The 3" width should allow plenty of room to accommodate trekking poles, sticks from the forest floor, or similar supports.



Prototype finished dimensions

VERTICAL SUPPORTS

For vertical supports, you can use any of the options mentioned above. Currently, I favor ultralight, youth-sized, aluminum arrows like these with the flights and nocks removed. Made by Easton and others, they can be found online and in well-equipped sporting goods stores for as little as $2.50 per arrow. They weighs only about ½ oz each, or about the same as a typical aluminum tent stake, yet are strong enough to support the screen securely. The sharpened steel tips resist wear and are also great for penetrating hardened soils. In addition, the small, uniform diameter of the arrows (¼") makes it easy to attach optional components, such as a front door, to the supports using small office binder clips (more on this subject below in the Adding a Roof section).

The nocks (bow string holders) can usually be cut cleanly from the arrow shaft using a hacksaw and the flights (plastic feathers) can be removed with a single-edged razor blade or box cutter (please be careful). Adhesive residues from the nocks, as well as logos or other printing that may be silk screened onto the arrow shafts can be eliminated with emery paper or fine-grit sandpaper.

With the nocks removed, these youth arrows are about 24" long, so they can be buried 5" or 6" deep and still have enough length remaining above ground to support the 19" wide oven bag screen. And if you want to get fancy, you can add lightweight plastic knobs (available at most hardware stores) to the tops of the arrows to make them easier to push into the ground and to help keep moisture and dirt from accumulating in the hollow shafts.

Aluminum arrows converted to KiteScreen supports (complete with ultralight knobs).
The oven bag screen, roof, and front panels (with binder clips) in pint Ziploc below. **(+)**

Round wooden dowels will also work but are not as durable as aluminum arrows. If you prefer this option, however, they are readily available from hardware stores, hobby shops, or even from the crafts department at Wal-Mart. I'd suggest using 3/8" diameter dowels for the best combination of weight and strength and would also recommend that you cut the dowels to a length of 24" each, at least to begin.

Home Depot sells 48" long dowels that can be conveniently cut in half to create two 24" supports. You'll need a minimum of 3 supports to test your KiteScreen, though 5 or 6 will provide a much more stable configuration. Because wood is a natural material, the weight of the dowels will vary a bit, but will probably average around ½ ounce each, or about the same as the arrow option.

Once each dowel has been cut, use a file or wood rasp to sharpen one end a bit to make it easier to push into the ground. You may also want to apply a coat or two of a waterproof urethane finish to improve weather resistance. (Note: for additional construction tips, see "Design Notes" below).

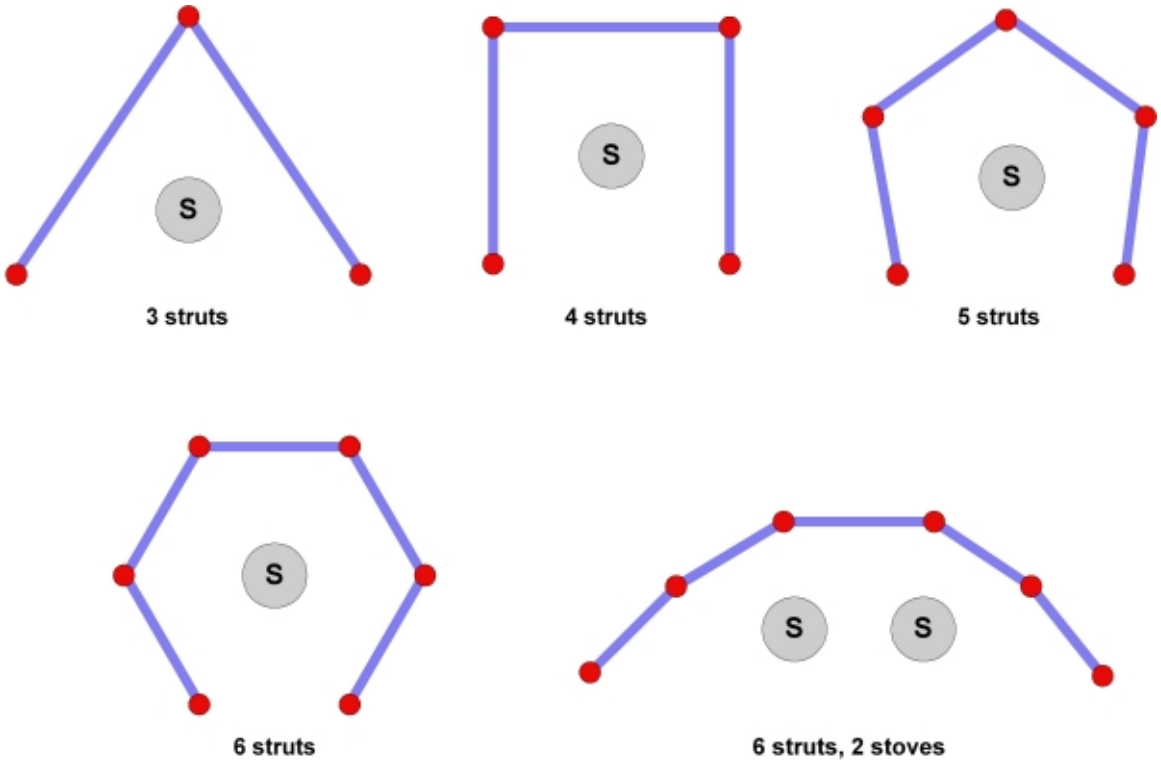
Once you've chosen or built your supports, you are ready to test your new KiteScreen.

Setup Instructions

Because the KiteScreen, much like a tarp shelter, can be configured in many ways, I think of the setup process as one of "pitching" the windscreen. Configuration options are limited only by your imagination and by the number of supports that you elect to use. Whatever design you choose, however, it's usually best to plant the two struts that run through the pole sleeves (designated here as "anchor struts") on the leeward end of the screen first, then add the remaining supports in their appropriate positions so that closed end of the screen faces into the wind.

The examples below can give you some configuration ideas, though I'd suggest using the 3 strut arrangement only if the forward support is something like a tree that's perhaps 8" to 10" in diameter and that's heat resistant enough to allow fairly close placement of your stove (see photo below). Otherwise, this configuration can make it difficult to maintain a safe distance between the stove and your fabric.

I normally prefer the 4 strut design, but 6 struts work better at higher wind speeds. The use of 6 struts makes it easy to apply a fair amount of tension to the fabric and will also minimize the inward fabric deflection caused by the wind. The use of more than 6 struts for a 5½' or 6' long KiteScreen is probably overkill. Also note that the diagrams shown below are not drawn quite to scale.



You'll notice that all the design suggestions shown above leave the leeward side of the screen open. This configuration works well in light-to-moderate winds and provides a convenient doorway for accessing your stove. Should you wish to "close the loop" under high wind conditions, there are several options. You can, for example:

- Move the anchor struts together to enclose the stove area. First, however, make sure that your screen is sufficiently long that you can maintain a safe distance between your stove and the fabric at all points along its length.
- Pitch the screen so that the open side faces a large tree, boulder or other natural wind barrier. To get to your stove, however, you'll now need to reach over the top of the screen (see below).

3 strut setup using tree as forward support and trekking poles for anchors (+)

Using a tree to help enclose the stove in high winds (+)

- Use your empty pack to close the gap. I'd recommend against using any piece of gear that's too "floppy" (like your wind shirt, rain shell or other piece of clothing), since it can be difficult to control where it might

end up in a strong breeze. Even a slight brush against a hot stove could ruin an expensive rain parka, for example.

- Construct a separate fabric doorway that can be attached to the KiteScreen. It can either be permanently affixed to one side, using a pole sleeve and strut on the other end to position it closed when desired, or it could be of a removable design, such as that shown in the photo below (which uses Velcro strips for attachment).

- If you use an umbrella on the trail, it too might be used to "close the door", but you'll probably need to hold it in position during your stove's operation to keep it from blowing away.

Silnylon version of KiteScreen with Velcro strips for door attachment (+)

Removable door attached and closed (+)

When you actually pitch the screen, you'll probably be able to push the struts 5" to 6" into most soils using just your hands. If you're camping on particularly hard ground, though, this task could become difficult. Rather than trying to pound the struts into place using a rock or other heavy object, however, I'd suggest using a tent stake to first create pilot holes.

Aluminum or titanium stakes will stand up much better to a sound beating than will, for example, a wooden dowel, which can quickly shred when being hammered. If using wide diameter supports, such as sticks from the forest, you can leave the stake in the pilot hole, then work it in circles to enlarge the cavity as necessary.

Once the screen has been erected, it's best to push the bottom edge of fabric all the way to the ground in order to seal it against wind leaks.

When you disassemble or re-configure your KiteScreen, either make sure that your stove is cool to the touch or remove it entirely from the vicinity of the screen. Otherwise, the loose screen fabric (which will inevitably flap about in the wind) can come in contact with the hot stove, quickly melting a hole in the material and probably also bonding a polymer residue to your stove or pot.

Adding a Roof

Sometimes in robust winds, air that's flowing over the top of the KiteScreen can still create turbulence inside (see diagram below). An effective way I've found to eliminate most of this turbulence is to add a roof to the KiteScreen.

For this purpose, I'd suggest using a length of heat-resistant nylon cut from a Reynolds (or equivalent) oven bag that's of an appropriate size. The roof can then be attached to the top edges of the screen using ordinary office binder clips like these.

I often erect the KiteScreen using a square configuration that's open at the back (i.e., the cooking side) and attach the roof using 6 binder clips, with 2 on each of the three sides. The roof fabric barely gets warm in normal use, and the "cracks" around the edges easily allow the rising warm air to escape.

And if the wind is really howling, your can add a front door as described above. In the right side photo below, the stove, which is now almost fully enclosed except for a small ventilation opening, can be easily accessed by removing one of the bottom clips.

Oven bag KiteScreen with roof attached using 6 micro binder clips. (+)

Front door added using 4 more small binder clips. (+)

Safety Note: If you're using a white gas, alcohol or other stove that requires priming (i.e., that may flare up during the ignition process), then I'd strongly suggest NOT attaching the roof until the priming flames subside and the stove reaches a stable operating temperature.

Design Notes

WEIGHT

The ultimate weight of your KiteScreen will depend upon the kind of fabric or film used, the finished dimensions, and the number and type of struts carried with you.

My original kite Tyvek prototype (with finished dimensions of 16" x 55") weighs 1 ounce. The silnylon version (which is slightly larger at 19" x 57") weighs 1½ ounces. Though I haven't constructed one yet, I'd guess that a spinnaker nylon version would probably weigh about half that much and a Cuben fiber screen even less.

The weight of my preferred oven bag model, which is 19" high and 58" long is 1.1 ounce. The roof, with attachment binder clips, adds another 0.4 ounce for a total for about 1½ ounces.

If you're traveling below tree line, you might elect to go "strutless", in which case your entire KiteScreen outfit could weigh as little as ¾ ounce or so if constructed from spinnaker cloth. You'd need then to use some combination of trekking poles, trees or sticks foraged from the forest to support your windscreen.

Even if your screen were made from silnylon and you packed 4 aluminum arrow supports (at a weight of ~½ ounce each), the total weight of the setup would be about 3½ ounces, or an ounce less than my old aluminum canister windscreen outfit. As a compromise, too, one could always carry a couple of arrows to serve as the anchor struts, then improvise the remaining supports.

CONSTRUCTION TIPS

- If you use plastic sheeting, poly-tarp, or even Tyvek for your windscreen, you can probably get by forming the pole sleeves using duct tape or a similar adhesive (DuPont, in fact, makes a special tape for use with

Tyvek). If you use a woven fabric like nylon or polyester, however, you'll probably need to engage the services of a sewing machine (if you don't sew, perhaps you can find someone who does). Including the time required to hem the edges (best for durability), it usually takes me about 1½ hours to cut and sew a new screen.

- Bamboo garden stakes work fairly well as struts and are my third choice (after aluminum arrows and 3/8" wooden dowels). If you decide to try them, however, I'd recommend that you buy the natural, un-dyed variety. The green dye used to tint some brands will probably continue to deposit color on your hands, windscreen, and other gear for their entire service lives, even after repeated robust washings. Also, packages of these stakes usually contain a variety of sizes. You'll want to use only those that are again, at least 3/8" in diameter, since the smaller ones tend to bend too easily when pushed into the ground and also lack the structural rigidity to adequately support the windscreen.

- If you use wooden dowels, you may wish to seal them with a protectorant such as Thompson's WaterSeal. Alternatively, I've used Minwax Polycrylic clear gloss finish from Home Depot (about $6.00 for a ½ pint can) with good results.

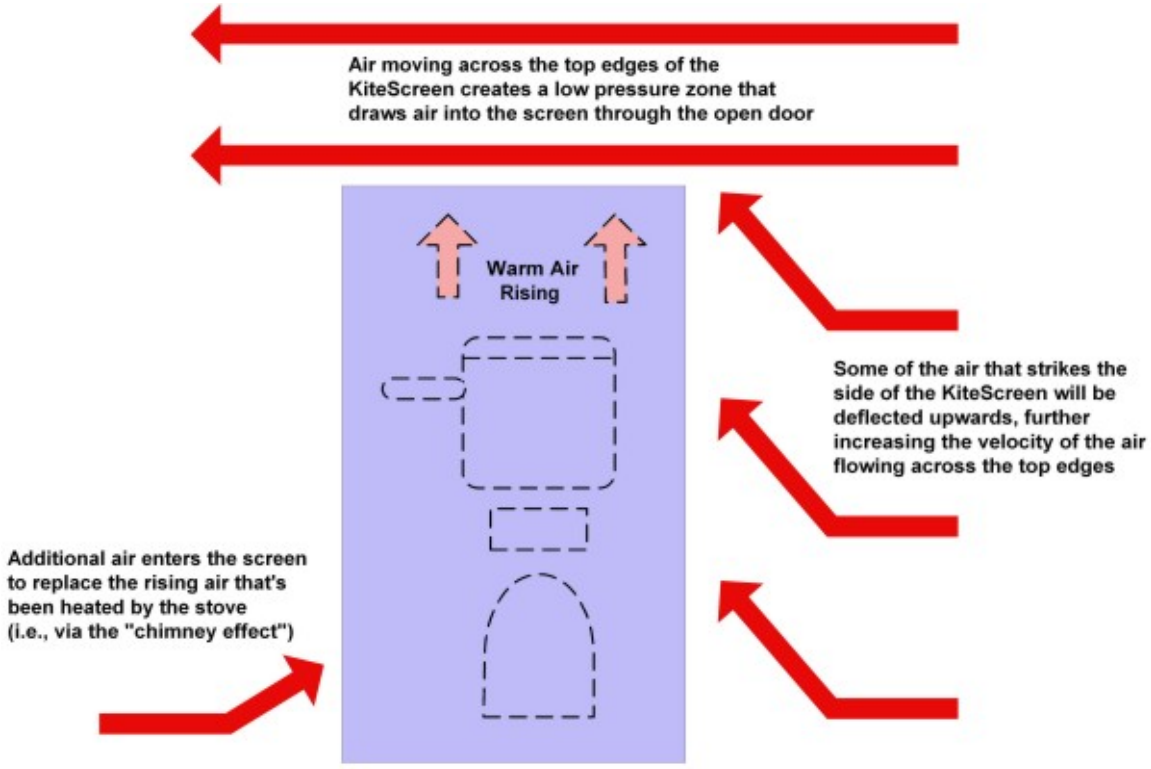
- If you use any type of hollow strut (such as a section of aluminum tent pole tubing), remember that unless somehow plugged, the end that's planted into the ground will collect dirt deposits that can be difficult to remove and that will cause your support to become heavier as it's used. The built-in pointed tips on aluminum arrows offer a great solution to this problem.

Usage Notes

AIR FLOW EFFECTS

The primary objective of any windscreen is to create a "quiet" air space around a stove so that wind can't create efficiency-robbing turbulence within the flame (perhaps even extinguishing it). No windscreen that I'm aware of performs this task perfectly, and some actually do a rather poor job. The KiteScreen, if securely erected and configured in a way that's appropriate for the prevailing conditions, should perform this duty very well.

However, as wind speeds increase, and if one side of the screen is left open, "Bernoulli's Principle" can begin to play a role in turbulence generation. High-velocity air flowing over the top edges of the windscreen can create a low pressure zone that will draw air in through the open door. If this happens, you may notice a slight disturbance in the stove flame as it "leans" toward the front of the windscreen.
In addition, as the stove heats the space inside the screen, the warm air will rise, creating a "chimney effect" that will draw additional air towards the stove (this happens, of course, with all windscreens).



The combination of these two effects normally won't have a significant impact upon the KiteScreen's performance and can be usually be ignored. Should you wish to minimize their collective influence, however, you can widen the doorway (if practical), which will reduce the velocity of the air that enters, along with its corresponding ability to disrupt the stove's flame.

A second option is to simply close the door using one of the methods described above. When the stove is fully encircled by the KiteScreen, internal air will be mostly drawn from over the top, as well as from beneath the bottom edges, reducing internal turbulence to very low levels.

A third option is to add a roof to the KiteScreen as described above.

Two other air flow effects that can sometimes occur with erratic winds are internal reflections and downdrafts, both of which can cause some turbulence inside a windscreen of any design. However, assuming the KiteScreen is at least 6" taller than your cooking outfit, the walls should be high enough to dampen the effect of most reflections. Likewise, a cook pot will help to shield the flame from possible disturbances caused by downdrafts. Both effects (which will probably be infrequent) should therefore have a minimal impact on your stove's efficiency.

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Measuring wind speed using a Brunton anemometer (wind meter) (+)

USE WITH CAMPFIRES

The KiteScreen is, in a sense, a "universal" windscreen, since it's compatible with just about any type of backcountry stove. In addition, however, it can also work with campfires as long as extra care is exercised. I rarely make fires myself, but the KiteScreen can be quite helpful, for example, in the early stages of building a small emergency or cook fire. Wind is often a major obstacle to getting such a fire underway, so the KiteScreen can serve to protect the seed flame from being extinguished. Once the fire is burning at a healthy rate, however, you'll want to either move the screen well away, or de-install it altogether, since the flames of a campfire are much less predictable than are those of a stove.

I can also envision a jumbo version of the KiteScreen that could be used to shield a group campfire, maybe on the bank of a river after a day of river rafting. Constructed perhaps of 4 foot wide plastic sheeting and built to a length of 25 feet, this mother-of-all-KiteScreens could probably be set back from a fire 15 to 20 feet or more and still do its job. It might be necessary to attach guy lines to the vertical supports if the winds were robust enough, but I think such a version could work.

A Work in Progress

I consider the KiteScreen to be a work in progress. By virtue of the the unrestricted release of this article, I am placing the KiteScreen's design concepts into the public domain for users to modify or improve upon as they wish. I'm sure, in fact, that there are aspects of the KiteScreen that haven't even occurred to me, but that will be obvious to others. So if you take an interest in the design, please report back through the feedback forum on your experiences and recommendations. This "open source collaboration" (to borrow a phase from the software industry) will strengthen the design for all of us.

Resources

- **Further Reading**. By far the most thorough analysis I've seen to date regarding the effects that wind has on stove performance was prepared by Will Rietveld at Backpackinglight.com in 2006.

Part I discusses primarily theory, while Part II deals with practical applications for the field. Will included the KiteScreen in his technology review and concluded that "...It really works."

To read the full text of these articles, you'll need a BPL.com online subscription, which is currently $24.99 per year (and well worth the cost, in my opinion); otherwise, only article abstracts will be available. By the way, I have no affiliation with BPL.com other than as a standard subscriber.

- **Reynolds Oven Bags** are available at most grocery stores and are probably the best all-around KiteScreen material currently available. In addition to Reynolds, other manufacturers offer similar products that are often sold in dollar stores.

- **Tyvek Type #1443R** (AKA "kite Tyvek") is an excellent material for KiteScreens. It's strong, durable, and both softer and lighter than the "Home Wrap" style Tyvek that many backpackers are familiar with. It's also plain white in color and lacks the printed logos found on Home Wrap. Further, it can be glued or taped, so pole sleeves can be formed without the need for sewing. It weighs 1.25 oz per square yard (manufacturer's specs confirmed on my own scale). Two online sources for kite Tyvek are Quest Outfitters and Kitebuilder.com. Both of these companies carry a wide range of other lightweight fabrics that could also work well for your KiteScreen.

- **Silicon Impregnated Nylon**, at a weight of 1.3 oz per square yard, is another great choice and can be ordered from Quest Outfitters, Thru-Hiker.com and a number of other online sources. Though it might be possible to form pole sleeves using a silicone-based adhesive such a McNett's SilNet (I haven't tried it yet), I'd probably count on having to sew this material.

- **Spinnaker Fabric** (nylon or polyester) at a weight of about 0.75 ounce per square yard, is even lighter than standard silnylon and can be found at Thru-Hiker.com, Gossamergear.com and a number of other online sources. As with standard silnylon, though it might be possible to form pole sleeves using a silicone-based adhesive, I'd again probably count on having to sew this material.

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