

You Don't Know Foam

Whether you use a gun or a straw, there's more to filling a gap than pulling a trigger

BY JUSTIN FINK

The first time I saw a professional spray-foam gun was when my friend Andy pulled his Pageris gun from a green protective case to air-seal and insulate around a window he'd just installed. The gun had a larger can than those that dispense foam through a straw, and it offered far better control over the size of the bead. In addition, Andy didn't have to come up with a use for the other 90% of the can's foam that he didn't need on this job. I decided right then that I was done blowing foam through a straw. It took me much longer to learn how to maintain one of these guns, though.

Andy's gun and carrying case cost more than \$100, but I opted for an entry-level gun from EFI (efi.org) that cost \$30—essentially the other end of the price spectrum in this category. That first gun lasted about a month before it became too clogged to function. I replaced it with a different model, then killed that one by snapping off the trigger while



GUN vs. STRAW

What does foam cost?

Cans of straw-dispensed foam are typically smaller than their gun-dispensed cousins, making it tricky to make a direct comparison. Taken on a cost-per-ounce basis, the straw foam is usually slightly cheaper, but that doesn't factor in realistic yield from the two different cans.

Gun foam
24 oz. can, \$9.60,
about 40¢ per oz.

Straw foam
16 oz. can, \$3.98,
about 25¢ per oz.

How much foam is in the can?

The listed yield for a can of spray foam—either straw- or gun-dispensed—is based on measurements from ideal laboratory conditions. In the real world, results vary based on the age of the can, how it was stored, how it's applied, and whether the propellant in the can escapes, which may be a problem when a can of straw foam isn't held in the correct position. In order to compare yield between straw-dispensed and gun-dispensed foam, I used 10-in.-dia. footing tubes as a form of graduated cylinder. To eliminate variables, I used Dow's Great Stuff Gaps & Cracks foam for all of the tests. Once each can was spent and the foam was cured, I peeled away the cardboard to look at core samples and to compare the yield.

The foam sprayed with water set up firmer, cured faster, and yielded almost twice the volume with fewer voids.



Gun yield
48 cu. in. per
oz. of foam

Straw yield
36 cu. in. per
oz. of foam

Gun yield
83 cu. in. per
oz. of foam

Straw yield
69 cu. in. per
oz. of foam

TEST 1

Disappointing yield?

Although I did the test at room temperature, laid the foam in fluffy beads, and let each ring set up before adding more on top, both the gun foam and the straw foam skinned over on top but didn't cure as well throughout. Each layer of foam from the straw can took so long to harden that I was sure the can was defective, a theory that was supported by the large, uncured cavern in the middle of the cylinder (which later collapsed and hardened). Surprisingly, though, a second test yielded the same results. The pockets were also present in the gun-dispensed foam, although they were much smaller, and none appeared to be uncured.

TEST 2

Just add water

Manufacturers of some cans of foam, both straw-dispensed and gun-dispensed, recommend misting water either into the cavity to be foamed or onto the uncured foam itself. Polyurethane is a moisture-curing resin, and the water is said to help speed up the curing process. I was interested to see if a light mist of water sprayed into the footing tubes before applying each layer of foam would help the foam to cure more fully and thereby eliminate the uncured pockets from the first experiment. Indeed, just two spritzes from a spray bottle before each layer of foam yielded foam that was firmer, that cured in minutes rather than hours, that expanded to roughly twice the yield of the cans in the first test, and that left hardly any voids.

Is there more than one flavor of foam?

A common misconception is that spray-foam guns are limited to small air-sealing and insulation jobs. It's true that the bread and butter of this category are expanding foams (for general-purpose sealing of gaps) and low-expansion foams (for sealing around windows and doors), but the number of other options for these tools is growing.

ADHESIVE

With various ASTM, building-code, and APA standards to back their reliability, adhesive foams are an attractive substitute for conventional tubes of construction adhesive. One can is equivalent to between 10 and 20 quart-size tubes.



FIREBLOCK

Less expensive than the intumescent caulk used to seal penetrations, many plumbers and electricians are now using fire-rated foam, usually orange, to meet code requirements.



EXTERIOR

Although conventional polyurethane spray foam degrades if left unpainted and exposed to UV light, several companies make UV-resistant foams, usually black in color, specifically for exterior applications.



PEST RESISTANT

Popular for their ability to turn away insects and rodents with their bitter taste or added scents, pest-resistant foams are a no-pesticide approach to blocking everything from bees to squirrels.



forcing it too hard. The next one met its end when I bent the barrel. This buy-break-replace pattern continued until I spoke with Peter Conlon from Todol Products—a company that specializes in polyurethane foam and that imports the Pageris gun Andy owned. I was surprised that Peter didn't laugh at my stories of repeated gun failure, but that's because he hears this from contractors every day.

Conlon taught me that although it doesn't take much to ruin one of these spray-foam guns, maintaining it and making it last isn't difficult either. You just have to understand the tool and the foam that it dispenses.

A delicate tool

The first lesson to learn is that the internal workings of a foam gun are fully sealed and always under pressure. Once the first can of foam is screwed into the adapter, the tool fills with foam, and a can must always be attached to maintain the sealed system. That means that 24 hours a day the foam inside the gun is trying to get out, and moisture in the air is trying to get in to react with the uncured polyurethane resin. This makes for a pretty delicate balance, and life in the trades is anything but delicate.

When the field of battle is the back of my bouncing pickup truck, I can guarantee that any encounter between a spray-foam gun and just about any other tool is going to end badly for the gun.

The problem is that if the barrel of the gun takes a hit, the rod will bend, and the seal at the tip will no longer be airtight. The same goes for the long can of foam that is secured to the adapter on the gun by just a few coarse threads. In either case, once foam has a chance to leak out or moisture has a chance to leak in, the foam inside the gun will cure and the tool will be inoperable.

The same risks of leakage apply when using the tool to foam around abrasive surfaces such as brick or concrete. In these cases, the delicate needle on the business end of the gun should always be protected by a sacrificial tip (bottom left, facing page).

The keys to getting light and fluffy foam

I haven't found a particular polyurethane foam that I like more than others, but I have learned some tricks for getting the best and most foam out of each can.

The first step is to shake the can heartily. The propellant and the resin need to be thoroughly mixed to get the best cell structure on a chemical level. This should be done before using a can for the first time and occasionally during use.

Polyurethane cures by reacting with the moisture in the air. If very little or no moisture is available, the light and fluffy foam will collapse into itself as it cures. A light spray of water applied to surfaces before filling voids with foam will go a long way toward getting foam to cure properly. This is especially important when working in areas of low humidity, but it's also best practice when filling deep voids. In the case of deep voids, apply the foam in layers, misting lightly between them. It only takes an ounce of water to cure an entire can of polyurethane foam, so think in terms of a spray bottle, not a garden hose.

Finally, it's crucial to have the can itself at room temperature (between 60°F and 80°F). Even if it's cold outside, a warm can of foam will yield satisfactory results. The propellant in the can boils at -10°F, so if the can is 60°F when you pull the trigger, the foam boils dynamically—like splashing water on a hot frying pan—and

Why you should upgrade to a foam gun

There's a reason most pros use foam guns rather than throwaway straws: The guns offer better control over bead size, can be held at a broader range of angles during use, and are reusable.



Bead control

Bead control on a can of straw foam is virtually nonexistent. Foam guns, however, allow you to dial in the maximum bead size—typically between $\frac{1}{8}$ in. and $1\frac{1}{4}$ in.—using the threaded knob on the back of the tool. Plus, the triggers usually have decent sensitivity.



Sacrificial and extension tips

Reducers, available in plastic and metal depending on the gun, are great for foaming into tight crevices. Because the seal at the tip of foam guns is crucial to maintain, they're also a good idea when applying foam along an abrasive surface such as masonry.

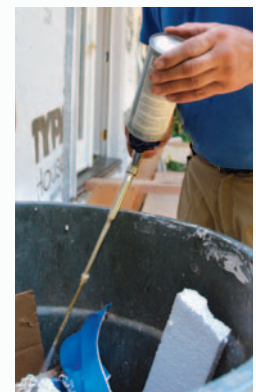


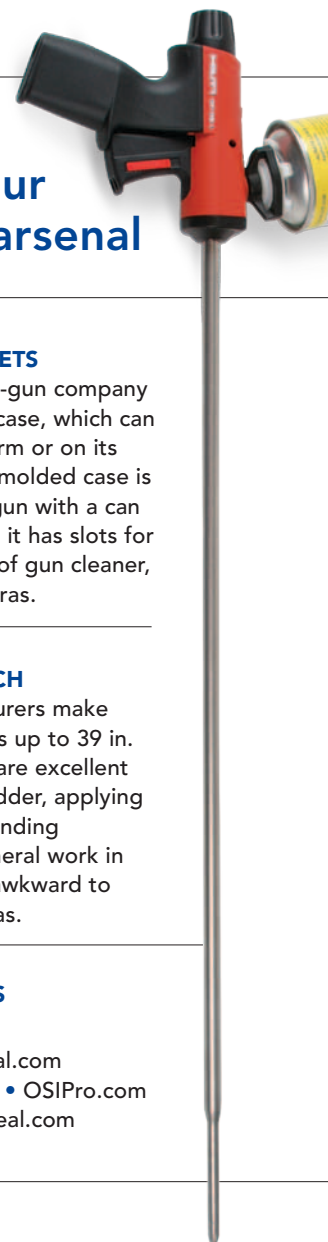
Reuse

When you pull the trigger on a can of straw-dispensed foam, you have just started a race against the clock to use up the entire can before the foam hardens in the straw and the nozzle. With a gun, the foam can be doled out at whatever speed or quantity you desire. You then can leave the can on a shelf for a month.

Cleaner compatible

Although they sometimes get a bad rap in terms of maintenance, foam guns are easy to maintain once you understand how they work. Always keep a can of foam on the gun, pull the trigger once a month to purge stagnant foam from the barrel, and run cleaner through the tool from a screw-on can after every case or so of foam you use, as shown here.





Hot-rod your foam-gun arsenal

PROTECT YOUR ASSETS

Todol is the only foam-gun company that offers a carrying case, which can be purchased in kit form or on its own. The green blow-molded case is designed to house a gun with a can of foam attached, and it has slots for two extra cans, a can of gun cleaner, and miscellaneous extras.

EXTEND YOUR REACH

A couple of manufacturers make foam guns with barrels up to 39 in. long. Although these are excellent for reaching from a ladder, applying to the floor from a standing position, or doing general work in open areas, they are awkward to use in constricted areas.

SOURCES FOR GUNS AND GUN FOAM

Dow.com • FoamNSeal.com
Fomo.com • Hilti.com • OSIPro.com
Todol.com • TouchNSeal.com

you get the best foam and the highest yield. If a can has sat in the truck during a cold night, the propellant will have contracted and the polyurethane thickened. Now you're asking the gun to push a thicker product with a less-than-optimal amount of pressure. You can end up with diminished yield, and certainly a much, much slower application speed.

Cleaner helps, but it isn't a cure-all

Just about every company that sells spray foam and foam guns also sells foam-gun cleaner. Essentially a can of acetone, the cleaner is screwed on and sprayed through the gun to clear out uncured foam. The key is to remember that acetone has no effect on polyurethane resin, but only on the propellant. So as the cleaner is run through the gun, the propellant is dissolved, but the polyurethane resins are left behind. Building up like plaque on the walls of an artery, this resin will eventually either gum up the internal components of the gun or prevent openings in the tool from fully sealing.

The only regular maintenance you have to worry about with these tools is pulling the trigger once a month to purge the barrel. Uncured foam sitting in the barrel of the gun starts to separate a bit over time,

and may cure. Pulling the trigger until regular foam is flowing again will clear out any separated resin.

That's not to say that you should never clean the tool, though. Best practice is to run cleaner through the gun for every eight to 10 cans of foam you consume. Screw on a can of cleaner, aim the gun at a piece of white paper, and pull the trigger. The cleaner will dissolve the propellant in the barrel of the gun and will physically push any uncured resins out. The reason for the white paper is so that you can track your progress. The spray will start as dark yellow, then lighten up, and eventually turn clear, which is when you should stop. If any specks of cured foam blast out during cleaning, it's usually an indication that moisture is leaking into the gun from somewhere, probably through the ball valve. After releasing the trigger, unscrew the can of cleaner from the gun, poke the ball valve with a Q-tip, and listen carefully. A hissing sound indicates that the ball isn't sealing completely, possibly because debris is clogging the ball-valve opening. If there's no hissing, you're set. □

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