

The Low Down

Extensive R&D by SPI leads to new frontiers for low-pressure applications

By Ryan Spencer

When contractors typically think of low-pressure proportioners, they think of sacrificing production for portability. That's not necessarily true in every case, as Specialty Products Inc. (SPI) has taken a systems approach to low-pressure applications by designing both materials and equipment. The company's Low Pressure Gear (LPG) and High Volume Low Pressure Series (HVLP) proportioners are both intended to spray proprietary low-pressure materials.

Called the Synergy Series, SPI's extensive line of low-pressure polyurea and polyurethane foam products are specially formulated for low-pressure applications, and are also optimized for being applied at room temperature (roughly, 70°F to 90°F). The company now offers six polyureas and nine polyurethane foams in the Synergy Series, a name SPI purposefully chose.

"The word synergy that we use is not just a marketing term," said Dan Helton, President of SPI. "It's synergistic in that we are building the equipment to the chemistry, and the chemistry to the equipment."

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When performing roofing applications, it's prudent to have a fall barrier in place. As an alternative precaution, workers can establish a warning line with markers located every six feet and have a safety monitor supervise the application.

LPG: Innovation and Mobility

The LPG is the end result of a lengthy research and development initiative undertaken by SPI, in conjunction with the government.

“The development started about seven years ago with a sizeable military BAA, which in layman’s is basically a grant,” said Helton.

SPI brought together a three-man engineering team tasked with designing a proportioning machine that could apply robust applications of polyurea while also being portable enough for a single person to carry. The finalized machine, the TI-13, featured a three-horsepower electric motor the size of a coffee can and at less than 40 pounds, it was light enough for a soldier to jump out of an airplane with it strapped to their back.

“We actually built 13 different machines before we settled on the one that went to the military,” Helton recalled, also saying



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that the translation from a military spec machine to commercial grade machine wasn’t explicit.

“There was no vision of foam at all when we were building the military device, it was built for spraying polyureas for blast mitigation,” explained Helton. “It was almost serendipitous that we found out we could make beautiful pour and spray foams at room temperature with this technology.”

Above: the LPG proportioner;
Left: a section of heated hose





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Left: an LPG rig, with material heaters;
Right: another LPG rig on a job site

The SPI team retooled the TI-13 for commercial release. The weight of the unit increased to just over 70 lbs., which is still a fraction of larger high-pressure machines. Instead of the 3-hp electric motor, SPI opted for a 1-hp gear reduction motor in order to minimize costs. In light of the power reduction, the LPG is shockingly efficient, as SPI touts the fact that the proportioner consumes less electricity than a hair dryer.

“You can run 100 feet of heated hose and the machine on a standard plug outlet,” said Helton. “It will do maximum capacity at about half of its electrical ability.”

The LPG’s maintenance was also a chief priority for SPI, and the design team aimed to make it virtually minimal. Many of the machine’s components, including the pumps, are easily and inexpensively replaced, as opposed to being repaired. A 10-minute change for a faulty pump is all that’s needed, as opposed to the extensive downtime that would accompany the same issue on a high-pressure rig. To give another example, the silica air dryer essentially never needs replacement, as it can be dried out periodically.

“You simply open it and put it on a baking sheet in the oven for a couple of hours at 200 degrees,” Helton said.

Lock N Load: Spray Gun

Naturally, it was important that the LPG be equipped with a spray gun that was similarly innovative, so SPI designed one that was optimized for low-pressure application. Called the Lock N Load, the spray gun uses air to purge the static mixers, rather than the mixing chamber, in the case of some high-pressure spray guns. The Lock N Load also takes advantage of having an electric controller.

“The trigger is electric, so it’s actually turning on and off the electric motor at the machine,” explained Helton. “Before you pull the trigger, you can adjust your output by turning the rheostat button...nobody has to go back to the machine to change output or change mixing modules.”

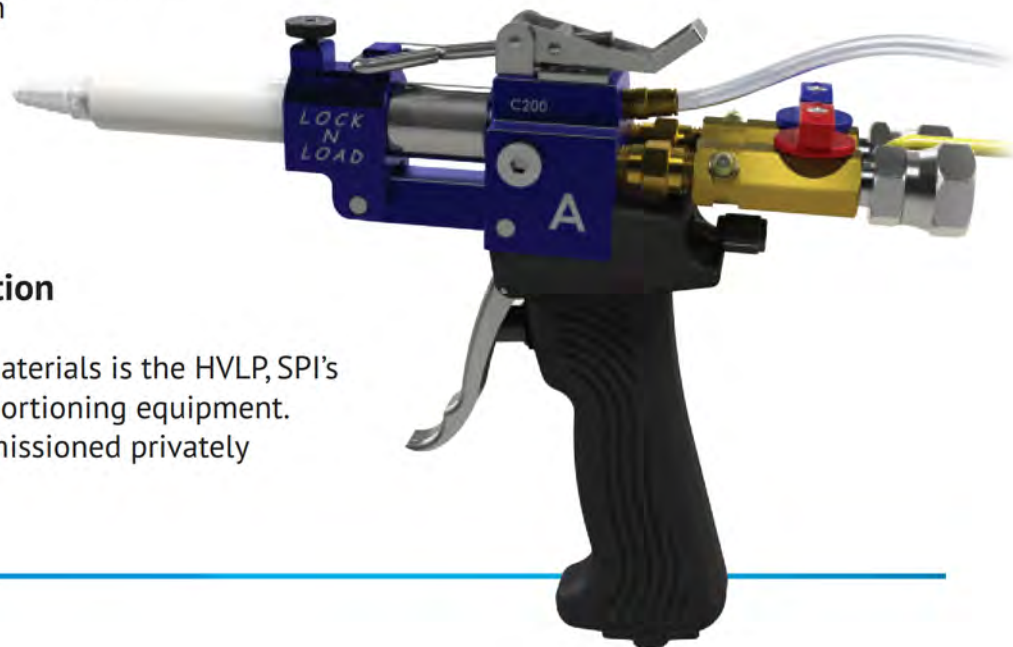
The gun-end output adjustment ability allows applicators to freely switch between low output for tight areas, like with trim work, and



high output for open areas, like between stud wall cavities. This simple process improvement can save an applicator considerable time over the course of a given project.

The Lock N Load boasts multi-application versatility, being able to adapt to spray, pour, and joint-fill foam applications via quick-change attachments. It's worth noting that when the spray attachment is connected, applicators can expect a significant reduction in airborne particles, relative to high-pressure applications. The production of airborne particles with the other attachments is minimal.

The Lock N Load low-pressure spray gun is designed to facilitate an easier application process

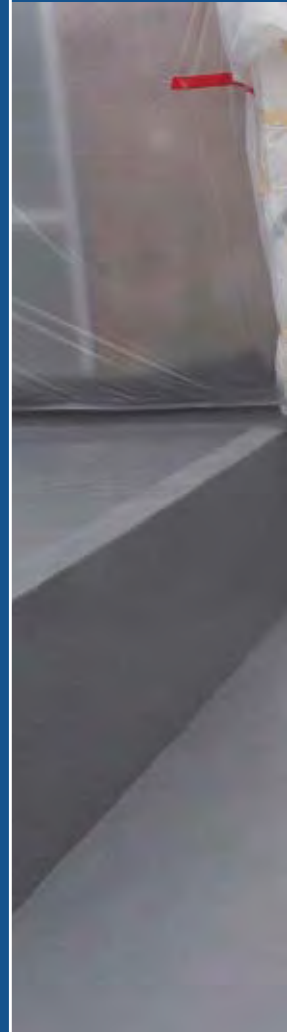


HVLP: Purpose-Built Production

Also processing Synergy Series materials is the HVLP, SPI's most recent development in proportioning equipment. Like the LPG, the HVLP was commissioned privately



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The Synergy Series
foam products can be
used for insulation and
roofing applications



before the company saw its potential for a wider commercial release. Built in 2012, the original proportioner, which had a delivery rate of eight gallons per minute (gpm), was designed as a solution for a contracting company that did soil stabilization applications.

“We built that from the ground up for them and then we realized it made beautiful foam with our Synergy technology,” Helton said.

The notable aspect of the HVLP’s design is the incorporation of surge tanks, which keep a constant delivery rate by containing reserve volumes of material that even out any pressure discrepancies that might occur as the transfer pumps move A and B components from the drums to the proportioner.

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The Synergy Series polyurea products being used during a commercial coating application.

“It’s the surge tanks acting as accumulators that are feeding the proportioner,” said Helton. “You typically have 60 or 70 psi being fed from your material supply transfer pumps to your surge tanks so that at all times you’ve got constant, steady, perpetual feed to your proportioning pump without mechanics of a transfer pump giving you any grief.”

In addition to consistent usage of material, the surge tanks also translate to a more even and thorough usage of material. Because the flow of material is kept consistent by accumulating in the surge tanks, there won’t be any leftover material due to uneven, or off-ratio, proportioning. Furthermore, applicators won’t have to worry about constantly monitoring the levels of material in A- and B-side drums.

“You can tip your drums and totes until they’re bone dry and it doesn’t matter because you’re working out of those surge tanks,” said Helton.

Also differentiating the HVLP from the LPG is the fact that it can be purpose built for a particular application. In addition to the standard rate of 4 gpm, the machine’s material delivery rate can be customized to 2, 6, or 8 gpm by substituting some of the components.

“We’d size the lower pumps, we’d size the air motor, and we’d size the surge tanks,” said Helton.

The HVLP also offers flexibility in terms of the application gun used. Like the LPG,



The High Output Pour Gun;
Opposite: front and rear
views of the HVLPG

the machine can apply SPF with the Lock N Load spray gun, but it can also be fitted with SPI's High Output Pour Gun for pour foam applications.

"It's our more sophisticated version of a manual 90 degree open-and-close gun," said Helton, who also explained that the gun can operate with or without electricity.

"You may be in a controlled situation where just the basic, raw machine without electricity is all you need," said Helton. "That's why we provided a manual gun, so you only need air."

Low Pressure in the Field

While the numerous features on benefits of the LPG and HVLPG-4 are noteworthy, they aren't worth their salt if the machines don't produce a viable end product. SPI took the issue head-on, directly comparing the Synergy Series foam made with the company's low-pressure proportioners to foam produced from standard high-pressure proportioners.

"When we've done blind testing with vendors, statistical error is just about the only thing we've seen," Helton said. "It's the same R-value, the same cell structure...in all aspects, the LPG's making great foam."

SPI asserts that applying Synergy Series foam under low pressure reduces the incidence of pinholes, which can occur when spraying on substrates like concrete. Furthermore, Synergy Series polyurea elastomers aren't prone to the same shrinkage issues exhibited by materials sprayed with high-pressure proportioners.

While mobility, efficiency, and foam quality are advantages of the LPG, productivity is not. With a material delivery rate of 0.75 gpm, the machine simply can't keep up with the production of high-pressure proportioners. So, keeping this tradeoff in mind, Helton stressed that there are situations for each type of proportioner. Obviously, you wouldn't want to spray a commercial SPF roofing system with the LPG, but you would want to use it to do small roof repairs. In that case,



REAR VIEW



the lower production doesn't inhibit the job, because of its size, and the unit's mobility is preferable to the deployment costs associated with a high-pressure rig. In that way, the LPG and a high-pressure proportioner can coexist, each being at a contractor's disposal when needed.

Helton mentioned a textbook example of a contractor taking the LPG where a high-pressure rig simply couldn't go: a camp located on a remote island in Canada.

"The only way in and out of there was water taxi," he said. "They brought the LPG and did six sets of foam inside of a new gymnasium at that facility."

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Synergy Series foam
being used during a
joint filling application



In that application, mobility was a necessity, and Helton said that the machine basically paid for itself in one job. At the more sizeable end of the spectrum, he mentioned the unit has been used to spray 20 sets of foam on several pole barns with little to no productivity-related issues.

In addition to application niches, the LPG also fits into business-centric niches, particularly for startups looking to get into the industry without having to make a major capital purchase for a high-pressure rig. New spray foam contractors can get the LPG's versatility and quality without having to worry about lengthy financing terms.

Since its release, Helton said sales of the LPG have been more or less evenly split between established contractors and new entrants to the industry.

The HVLP is somewhat of a different animal. It isn't optimized for mobility, but it does offer a higher degree of production, relative to the LPG. When the Lock N Load gun is attached for spray foam applications, the HVLP can deliver a 1.25-gpm output with the machine customized to 2-gpm components (the machine's SPF output is limited to how much volume it can process while maintaining a proper spray pattern.) In terms of peak

performance, the unit can be custom built up to an 8-gpm output for polyurea coating applications.

The HVLP also benefits from being able to serve a wide variety of industries, expanding well beyond its originally intended soil stabilization applications. On the industrial end, the HVLP can be used for tank and pipe decommissioning, pipe insulation, and even mineshaft closures. The machine can also be purposed for in-plant applications, like mold fabrication, packaging, and refrigeration insulation panels. One of the first HVLP machines sold was customized for marine applications, specifically, producing floating docks for personal watercraft.

It's clear that SPI's low-pressure proportioners can provide solutions for numerous polyurethane foam and polyurea applications, and their development has opened new doors for low-pressure proportioning in a high-pressure-dominated industry. So it seems the next chapter, as far as SPI is concerned, is to see how much elbow room low-pressure proportioners can make for themselves in the industry.

For more information about the LPG, HVLP, or Synergy Series, please visit www.specialty-products.com. 