

The Backing Business: Backing producers show their value through a range of innovations - Jan 2017



By Darius Helm

Before the vertical integration by major mills like Shaw and Mohawk reduced the field of independent carpet backing producers a decade ago, a steady stream of innovations had elevated backings from commodity materials to both critical components for successful carpet installations and platforms for the advancement of carpet design and performance. For the next several years, new developments were few and far between. But just in the last couple of years, new demands in the market have spurred another round of innovations, much of which has been developed by independent backing producers.

To be fair, not everything has come through independent producers. Both Shaw and Mohawk, for instance, have driven new backing developments, and fiber firms like Invista have played a role. But whether driven by internal evaluations of the needs of the market or at the behest of the major mills, the research and development behind the scenes-by the independent backing producers or by other types of specialty firms-is where most of the technical solutions are achieved.

Despite the impact on R&D from the vertical integrations, mills have found effective ways to drive innovation in recent years. Sometimes it comes from partnerships with backing, pad and underlayment firms, and sometimes it's through internal cross-pollination. Take the most prominent residential carpet developments of the last few years: Stainmaster's PetProtect, Shaw's LifeGuard and, now, Mohawk's Airo.

PetProtect carpet, for instance, is the inspired marriage of Stainmaster Cushion with its breathable moisture barrier (made by specialty cushion firms) and rebranded solution-dyed nylon fiber, which was originally called SolarMax and was marketed for its light fastness. Shaw's waterproof LifeGuard is a modification of its commercial EcoWorx Performance Broadloom technology, which replaces the latex layer with an extruded polyethylene precoat.

It's worth noting that one of the greatest successes of these two programs is their added value, and as such they help counteract the forces driving carpet toward commoditization.

MAJOR POLYESTER DEVELOPMENT

New to the market this year is Mohawk's Airo (a separate report on Airo from Kim Gavin starts on page 67), and it may well be one of the most important developments in carpet design in the modern era. Its single most important attribute is that it is made entirely of PET. PET carpet fiber is tufted into a PET primary backing, which is fusion bonded to a thick piece of needlepunched PET with a PET adhesive system. No latex and no filler, two components that have been used in the construction of virtually all broadloom for the last 50 years.

Not only are the face fiber and needlepunched felt layer made of 100% PET recycled from drink bottles, but the product is itself fully recyclable. Mohawk has even tested its limits by recycling 100% of the carpet into new PET fiber, though for now that's not a target strategy. It will be several years before any significant volumes of Airo go through their useful lifecycle and are ready for reuse, and by then there will hopefully be some established high value markets for recycled PET carpet. And Mohawk has a number to call, (844) 383-AIRO, when that time comes.

So Airo has a strong green story, but it also offers other valuable attributes. For instance, it's not manufactured like traditional residential broadloom under extreme tension in a tenter frame during the finishing process. According to Mohawk, it's more like a rug. And that means no knee kickers, tack strips and seaming irons for installation. Instead, it goes down along the perimeter

and seams with double-sided tape. And it won't scratch baseboards like latex-based carpet.

Airo is made at Mohawk's Northwest Georgia facilities, with most of the components produced in-house-in the long run, Mohawk intends to internally produce all of it. The technology was developed by DSM-Niaga, a Dutch joint venture between DSM, a giant chemical firm, and Niaga, a start-up specializing in sustainable materials development.

Mohawk has a great track record when it comes to forging these sorts of exclusive partnerships. Over a decade ago, it acquired the North American rights for residential carpet fiber made out of DuPont's Sorona, a polymer called triexta that DuPont produced with 37% bio-based content, and turned it into the hugely successful SmartStrand residential carpet program.

DEMANDS IN THE MARKET

Currently, some of the most prominent issues in the backings business are moisture (from above and below), acoustics, mold and mildew, and environmental sustainability. Moisture from below is often an issue on the commercial side, when contractors under time and budget pressures fail to give concrete time to set properly; while moisture from above-spills-is an issue in any environment. Mold and mildew flourish in both conditions.

Environmental sustainability is an issue for all manufacturers, but the real demand is on the commercial side. Recyclability, recycled content, bio-based content, energy consumption-these sorts of characteristics drive sales.

Acoustics are more important than ever. In the commercial market, wellness standards and the need to balance collaborative spaces with quiet refuges are driving demand for sound abatement solutions. On the residential side, increased demand has grown organically with the surge in multi-family housing, and also because people are living in closer quarters, both in terms of urban drift and the actual concentration of people in living spaces.

Other issues include latex replacement systems, in part driven by environmental considerations, since latex is not recyclable and the calcium carbonate filler in it has little value.

All of these needs have put backing, cushion and underlayment producers into an investigative mode, leading to the development of new products and the enhancement of existing products, and they've been working with other entities to identify chemistries and technologies that can bring value to their products.

PRODUCER HIGHLIGHTS

In recent years, the most prominent development by independent backing firms is Propex's Artis. Artis came on the market about five years ago as a woven primary PET backing for carpet tile, which up until then had largely relied on spunbonded PET nonwovens-polypropylene, the standard material for broadloom primary and secondary backings, has too low a melting point to provide the necessary dimensional stability for carpet tile. Artis was developed as a valuable solution to carpet mills, citing better stitch lock than nonwovens and increased throughput, among other things.

Over the last five years, Propex has added Artis FLW, with a needlepunched PET fiber cap, then Artis Tru and Artis Fuze, adding dimensional stability and effectively eliminating grinning, which is when the backing shows through. Artis Tru is the premium product, and the most effective solution for lightweight carpet tile.

Artis has been a successful program, and a savvy one, since it reduces Propex's reliance on the shrinking broadloom market and positions it for growth with carpet tile. The firm is continuing to innovate around the Artis line, working with customers on the next generation. To date, the firm has sold tens of millions of square yards of Artis, and about ten North American mills use the product in their commercial carpet tile lines.

Another leading independent backing producer is Mattex, which is headquartered in Saudi Arabia. Most of its production is on the Arabian peninsula, but it has also been producing woven backings in Eton, Georgia since 2015. The Eton facility manufactures three primary products: woven polypropylene primary backings, polypropylene secondary backings, both for broadloom, and polyester primary backings. It also does polyethylene extrusion for synthetic turf backings.

The polypropylene secondary uses a spun yarn along the weft for better latex adhesion. And according to the firm, its PET wovens can also be used for broadloom and artificial turf. The 500,000-square-foot facility, which employs 165 people and cost

about \$70 million to build, extrudes its own tape from U.S. sourced polymer.

Mattex also has a partnership with DSM-Niaga, using its U.S. capacity to provide all of the PET woven backings for Mohawk's Airo 100% PET carpet. Currently, Mattex's PET backings use virgin material. Also new at Mattex is Link, a woven PET with an attached nonwoven fleece. The product is designed as a primary backing for carpet tile.

Mattex is also focused on growing its artificial turf business, purchasing Low & Bonar's artificial grass business last summer with its production facility in Abu Dhabi. The firm is developing a dedicated turf backing program, with primaries and secondaries made of polypropylene or of a mix of polypropylene and PET. Its Dual Back, introduced last year, interweaves PET and polypropylene into a single layer backing with high performance characteristics.

One firm that always bears watching is Universal Textile Technologies (UTT), best known for its EnviroCel and BioCel polyurethane backings, which feature both bio-based and recycled content. UTT is an inquisitive firm, always looking for new ideas and new roles it can play. Over the last few years, it has partnered with national parks, federal agencies and other national institutions to develop programs and advance sustainable causes.

UTT has developed a residential polyurethane backing system that is currently being tested by some of the leading domestic carpet mills, as is its residential cushion tile. Both systems use EnviroCel backings. Also, UTT has doubled the bio-based percentage in EnviroCel Cushion and BioCel cushion over the last year.

Another concept that UTT has been examining is piezoelectricity, which is the release of electric current when a material is deformed or compressed-it's the same principle that runs quartz watches. According to the firm, it has been working with the innovative scientists at Georgia Tech on a project to put piezoelectric systems into carpets, mats and synthetic turf. Such systems can do everything from recording data-for instance, piezoelectric systems installed in artificial turf football fields can record data about speed, force and pivot for every player, and installed in convention carpet can yield all sorts of data about foot traffic-to generating electricity.

Low & Bonar, which was Bonar prior to the renaming of all affiliates last April (and before that, it was Colbond), makes the Colback line of nonwovens for carpet tile with production facilities in Europe, China and the U.S. The parent company, which is publicly traded on the London Stock Exchange, has annual revenues of just over half a billion euros. In the U.S. the firm has two Colback facilities, both in Asheville, North Carolina.

Last year, Low & Bonar opened its first facility in China, and it is already almost at capacity, so a second line will be added by the beginning of 2018, doubling capacity with another 650 million square feet.

What makes Colback unique is that it actually extrudes two polymers, polyester and usually nylon, with the nylon as a skin bonded to the polyester core for enhanced strength and dimensional properties. In Europe, Low & Bonar was the first firm to produce 100% post-consumer recycled nonwoven carpet backing material, with Aquafil providing the recycled nylon.

Trinseo, which was originally spun off from Dow in 2010 as Styron, went fully public a couple of months ago. The firm has multiple facilities in Asia, Europe and the U.S., where it produces styrene butadiene latex, which is used for a wide range of applications beyond carpet backing, the biggest of which is paper coating.

Over the last year or so, the firm has shut down a couple of facilities, one in Italy and another in Dobb's Ferry, Connecticut, citing falling coated paper demand. Its remaining U.S. facilities are in Midland, Michigan and Dalton, Georgia.

This year the firm will launch the next generation of its workhorse latex product, as well as a modified acrylic precoat for carpet tile applications-PVC backed carpet tile can't use styrenated polymers because it generates plasticizer migration. While Trinseo has offered an acrylic latex for years, this new modified version offers higher wet strength and better dimensional stability.

Textile Rubber & Chemical Company, which is headquartered in Dalton, Georgia, serves the carpet industry through its TR Polymers Group, which includes its polyurethane, latex and thermoplastic technologies. This year, the group will announce new developments in its residential and commercial attached cushion programs, as well as in its rug, automotive and synthetic turf programs-the firm reports that last year its synthetic turf polyurethane backing business had another record year.

The TR Polymers Group has also formed a new unit focused on developing lamination and coating technologies that will allow clients to laminate various fabrics together, which should spur the development of coatings and backings with specific properties, like moisture control and dimensional stability. Current sample coating equipment can process up to 10' widths, with wider widths to come.

CUSHIONS AND UNDERLAYMENTS

Underlayment specialists have been hard at work providing solutions to issues like moisture and acoustics. MP Global, for instance, is launching a new product at Surfaces called VentiLayer. The product is manufactured with the same recycled fiber as QuietWalk, its best selling product, composed of 95% post-industrial content. VentiLayer features an additional layer that elevates the pad sufficiently to allow airflow beneath it. It's designed to vent moisture from problematic concrete subfloors, obviating the need for a false subfloor or some other layer to seal off the concrete.

VentiLayer's recycled fibers, treated with antimicrobials, are sourced from the carpet and textile industries. The product, which installs like a regular underlayment, will be sold to both the residential and commercial markets.

The firm has also added to its QuietWarmth underfloor heating systems with QuietWarmth Joist, a retro-fit product that goes beneath subfloors between the joists.

Floor Muffler, a division of Diversified Industries, has nearly doubled its SKUs in the last year and a half with new product developments for moisture control, sound abatement and other performance attributes. Until recently, all of its flooring products served the hard surface side, but now it has come out with sound abatement products for carpet. Its premium carpet backing is called Sophia by Floor Muffler.

At Surfaces, Floor Muffler is launching a new moisture control product with a vapor barrier for hard surface flooring, along with a floor protection product designed to protect new flooring installations when other trades are working over them. It will also introduce a rubber underlayment that goes under hard surface flooring as well as a line of rubber flooring in rolls and interlocking tiles.

Reliance Carpet Eco-Cushion, a Los Angeles-based firm that makes fiber pad out of 100% post-consumer recycled carpet content, has upgraded its offering with a sealed surface that prevents glue from seeping through. The fiber pad is made of recycled PET. Reliance Cushion mostly goes to the hospitality market. And looking ahead, the firm is working on carpet tile products.

Leggett & Platt may be the biggest producer of rebond in the market, but its offering to the flooring industry actually goes well beyond that. It also offers padding for laminate, hardwood, LVT and, starting a couple of months ago, rigid core LVT. And in carpet it goes beyond rebond with products like Duraplush, a densified urethane.

The firm's Whisper Step for rigid core LVT, introduced last summer, is the densest product on the market, according to the firm, which helps it retain its dimensional integrity.

Another cushion maker is Richmond, Virginia-based Carpenter, which last year came out with Serenity, a new luxury prime urethane cushion made of a poured, rather than a bonded, foam. The firm's premium bonded products use a blend of recycled urethane foam trim and visco-elastic memory foam. Carpenter is also a producer of Stainmaster cushion used in the PetProtect program.

WHAT'S ON THE BACK OF THE BACKING?

The Carpet and Rug Institute has helped launch a voluntary program, starting this month, of mills back labeling their broadloom with the fiber type. This is a big win for the collector and sorter community, which has had to rely on expensive scanning guns that can give false readings and perform poorly in high moisture conditions, among other problems. However, it will be years before the carpet produced this year ends up reclaimed and channeled into the recycling stream.

All of the CRI members have agreed to the back labeling program. It took a little time to sort out some basic standards, like

the frequency with which the labels should be printed and exactly how to convey the information. It looks like a basic three or four character set will be printed, like N66, PET and PTT.

The program will apply to all carpet, both residential and commercial. And back labeling for carpet tile should follow quickly, probably by mid-year.

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