



GREENBLUE®

# FEATURE: MOHAWK

## **Chemical Recycling**

Making Fiber-to-Fiber Recycling  
a Reality for Polyester Textiles



# Mohawk's Air.o™ - A Better Designed Solution

**M**ohawk Industries Inc. is the largest carpet manufacturer in the world. It also has been one of the carpet industry's leading innovators. In 1999, Mohawk released the first residential carpet made from recycled fiber from recovered PET bottle resin. Today, Mohawk PET carpets contain up to 100% recycled face fiber. The recycled fiber product line has been a commercial success and Mohawk is one of the largest bottle recyclers in the U.S., diverting 6.3 billion bottles from landfills annually.

In 2011, Mohawk began an ambitious R&D program to design a carpet made totally (face fiber, primary and secondary backings and adhesives) from 100% PET resin. The company's motivation for the program was partly an acknowledgement of the difficulties recyclers encounter trying to economically recycle traditional carpet constructions, but it was also a desire to create a product that had the potential to become a source of materials for manufacturing carpets in the future.

It took five years to develop [Mohawk's Air.o carpet](#), the industry's first 100% PET residential carpet line. Mohawk partnered with DSM-Niaga

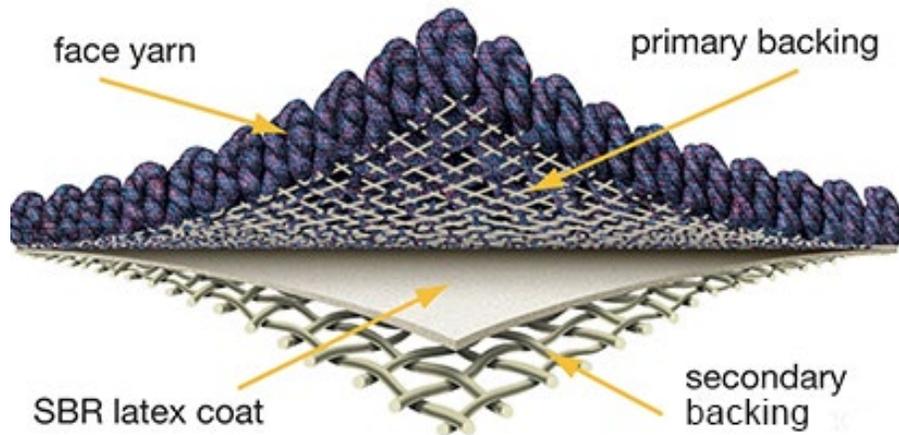
to utilize their patented resin system and lamination process to create the Air.o carpet, a new invention of flooring that Mohawk is calling "unified soft flooring", because it unifies all of the components - face fiber, primary backing, adhesive and a secondary cushion backing into a single product. The DSM-Niaga resin system allows Mohawk to tuft its high-recycled content PET fibers into a PET primary backing which then goes through a heat-rolling process to fuse the materials. Mohawk uses a proprietary PET adhesive to join these components to its non-woven cushion layer ("secondary backing"), which is also made from recycled post-consumer PET. Air.o contains no latex, calcium carbonate or bitumen, which constitute 40% or more of the weight of typical carpets, creating a disincentive to recyclers because these materials have little to no economic value.

One of the more practical benefits of Air.o is it is much easier to install. Traditional carpet requires installers to use a separate carpet underlayment as the cushion layer and then to secure the carpet layer on top of that. Because Air.o's integrated construction is dimensionally stable, it does not require tacking strips

along wall edges or knee kickers to stretch and orient the carpet, and it requires up to 50% less time to install than conventional residential carpeting. Mohawk also reports that the ease of installation of Air.o increases the productivity of skilled labor, translating into cost savings for Mohawk's retailers and consumers.

Mohawk has plans to create its own circular economy for the Air.o product. The average service life of a residential PET carpet is about seven years. Mohawk currently has a product [take back and recycling program](#) available for its carpet product lines that it can leverage for the future collection of Air.o. Mohawk has conducted trials successfully demonstrating they can shred recovered Air.o and mix it with recycled bottle resin to extrude high quality PET face fiber. Today, higher amounts of recycled carpet content can be used if the recovered recycle is intended for use in the cushioned backing system. Achieving higher rates of recycled content may be possible in the future depending on how large a base of installed product Mohawk has available to harvest. Mohawk is in the process of creating an enhanced take back program for Air.o to bring post-consumer flooring to designated Mohawk

## TRADITIONAL BROADLOOM CARPET CONSTRUCTION



SOURCE: [SHAW CONTRACT, 2017](#)

## MOHAWK “AIR.o” MONOMATERIAL CONSTRUCTION

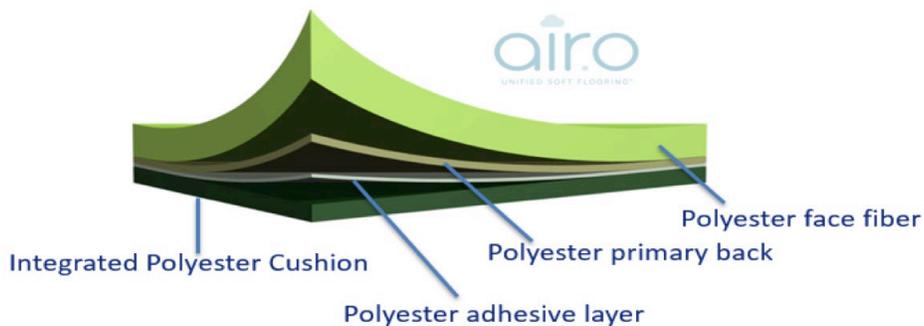


IMAGE COURTESY OF MOHAWK, 2017

processing facilities.

Air.o is a perfect “nutrient” for chemical recycling because 100% of the material can be converted to monomers with relatively fewer by-product streams (e.g., colorants and additives). For example, typical carpet constructions use approximately two pounds of latex per square yard as the primary means of bond-

ing all materials together. Air.o achieved an 80%+ reduction in the weight of the bonding material by using a PET adhesive. The most significant achievement Mohawk has made with Air.o is the design of a product where 100% of the material can be mechanically recycled back into the same product using high quality materials. On average, mechanical recycling

requires less energy than chemical recycling, though recent innovations introduced by Gr3n, Worn Again and Loop Industries seem to have narrowed that gap considerably.

For more information about Mohawk Industries Inc. or their Air.o unified soft flooring product, see [www.Mohawkflooring.com](http://www.Mohawkflooring.com). 