



## FOAM OR FIBER?

### A Comparison of Fill Material for Outdoor Cushioning

#### INTRODUCTION

For the average consumer and retail furniture buyer, navigating the world of cushion materials can be a confusing proposition. With a technical community that continues to innovate, it is sometimes difficult to differentiate which innovations create real value in terms of performance and customer experience and which are just enhanced marketing. Polyurethane foam and polyester fiber remain the industry standards, yet the variety of choices that exist within these two options create a decision-making process that is significantly more complex.

#### KEY PARAMETERS IN CHOOSING POLYURETHANE FOAM<sup>1,2,3</sup>

Polyurethane foam has long been a staple of the cushion industry. Its excellent performance over extended use coupled with a variety of types that can be tailored to specific applications allow retailers to customize their offerings to individual markets.

When discussing the material in terms of outdoor performance, there are a few characteristics that require some consideration. All flexible polyurethane foams have an open cellular structure which, when applied in an outdoor setting, means that moisture can penetrate the body of the foam. While polyurethane foam itself has antimicrobial properties, additional additives are often preferred for use in outdoor applications in order to further protect against the effects of exposure to moisture. The other two main performance elements to consider when reviewing foam are **density** and **indentation force deflection (IFD)**. Density, typically measured in pounds per cubic foot or kilograms per cubic meter, is one of the key determining characteristics of a foam's durability. A higher density rating will in most cases equate to longer-term durability in the finished product. IFD refers essentially to the feel of finished foam—i.e., the hardness or softness thereof. IFD is measured by the pounds of force required to indent a piece of foam to 25% of its original thickness. Standard ranges are from five pounds (softest) to eighty pounds (hardest).

Taking into account projected use and required longevity in the market, these criteria are key in determining the appropriate foam type for a specific application.

## COMMON FOAM TYPES<sup>2</sup>



### Standard foam

This is the most common type of polyurethane foam available. It is able to be poured with a variety of densities and IFDs, making it a viable option for myriad applications, both indoor and outdoor. In standard cushion applications, it can provide the comfort, support and durability required.



### High resiliency polyurethane foam

This foam type is almost identical to the standard foam in use and function, with one key exception. It is created by using a higher grade of raw material and a slightly altered process that makes the cellular structure of the finished foam more random than that of standard foam. This has two distinct effects: first, this foam will return to its original shape more quickly than a standard foam when compressed. The second and perhaps more important effect is that this altered cellular structure gives the foam a higher durability than its standard counterpart. This foam has a clear use in high traffic situations where performance is required over an extended or heightened period of use.



### Dry fast or "reticulated" foam

This foam type is standard open cell foam which has had the cellular structure exploded in order to create an open porosity visible to the naked eye. While other foams in this category may retain moisture, the structure of reticulated foam has been opened to an extent that it will pass directly through. The challenge with this material is that, due to the volatility of the process used to make it, there is only a limited offering in both density and feel (IFD). This foam is primarily used for outdoor applications in the cushion industry as well as in the filtration industry.



### Viscoelastic memory foam

This foam is also occasionally dubbed "slow recovery" foam. The key characteristic of viscoelastic foam is that the cellular structure is more fluid, conforming to pressure and returning to original form at a slower rate than standard foams. This makes it ideal for use as a comfort layer in mattresses and other typically indoor furnishings. It does, however, have a couple of challenges due to its structure: it is less supportive than standard foams, and it is highly sensitive to heat and humidity (both of which affect the recovery of the material and can limit its outdoor uses).<sup>4</sup>

**New foam trends and technical developments:** As mentioned earlier, the technical side of the foam industry is ever evolving, which is giving the market access to new products all the time. A few of the most exciting new developments are **cool touch foams**, **mineral-infused foams** and **eco foam**. Cool touch foams are being heavily used in the mattress industry, as they have a less reactive structure to heat (both in dispersion and the way heat influences the structural integrity of the material). Mineral infused foams can give a foam mattress a lavender scent over an extended term of use (again, marketed toward the mattress industry). Eco foams use plant-based chemicals as a portion of the raw material (versus complete use of petroleum-based chemicals) for a more environmentally friendly, sustainable product. While these are currently used predominantly in the indoor cushion and mattress industries, as the technology continues to evolve so too will the range of uses.<sup>5</sup>

## KEY PARAMETERS IN CHOOSING POLYESTER FIBER<sup>6,7</sup>

Polyester fiber has long competed with foam as the fill material of choice in the cushion industry—particularly when it comes to outdoor applications. Not only is it typically cheaper than the foam alternative, but its natural properties make it antimicrobial and moisture resistant.

When discussing fiber characteristics for any application, there are four traits that affect performance:

1. **Denier**, which equates to the thickness of the fiber. A thinner denier will have a softer feel, whereas a thicker denier will have a coarser, robust feel.
2. **Length of the fiber**, which affects how the fiber fills out the covering and how much fiber is required to meet the finish.
3. **Crimp of the fiber**, which speaks to the number of bends put into each strand of material. The crimp is particularly relevant in blown applications where more highly-crimped fibers have a higher resilience.
4. **Conjugation of the fiber**, or twist, which adds to the fiber's resilience.

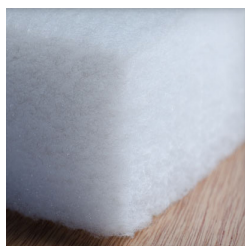
Additionally, fibers come in several classifications dependent on the base material—for example, virgin, semi-virgin or recycled, which speak to the amount of recycled material included in the finished fiber. Many recycled materials can come close to the performance of the virgin (new) material; however, virgin material will have the overall best durability and feel.

## COMMON POLYESTER FIBER FINISHES<sup>6,7</sup>



### Blown polyester

Often, raw polyester fibers are mixed and blown into casings as a fill material for pillows. This is a common alternative to down pillows or shredded polyurethane foam. Additionally, some of the more expensive low-denier virgin materials (down alternative) can very closely imitate the feel and function of down while maintaining the properties that make it ideal for outdoor use. While this virgin material is somewhat more costly than the recycled options in the market, a wide variety of feels and finishes can be provided by each for use as pillows or cushioning.



### Thermal bonded batted polyester

Thermal bonded batted polyester consists of polyester fibers which go through a mixing, layering and heat treating process to create a substitute product for polyurethane foam. This material can be layered to a variety of densities and thicknesses to emulate the properties of foam. While this material is cheaper than foam options and does not retain moisture as many of the foam options can, it suffers from a lower durability than comparable foam options. This is an important consideration when weighing it against foam as a fill material for cushions, dependent on the expected life cycle of the finished good.

## COMPARISON BETWEEN FOAM AND FIBER USE

When finally comparing polyurethane foam versus polyester fiber applications, particularly for outdoor use, note that it is possible to create a high-performing and durable product using either. The key is matching the performance expectation, environmental expectations and required finished feel and aesthetic with the appropriate material.

### FILL MATERIAL DECISION MATRIX

	Moisture Resistance	Microbial Resistance	Durability	Cost	Market Applications	Notes
<b>Standard Polyurethane Foam</b>	Good	Good	Better	Mid	Furniture cushioning, Insulation	Widely used industry standard for cushioning and upholstery
<b>High Resilience Polyurethane Foam</b>	Good	Good	Best	Mid-High	Furniture cushioning, Insulation	Used widely in contract and commercial furniture applications
<b>Dry Fast or Reticulated Foam</b>	Best	Best	Better	High	Furniture cushioning, Filtration	For cushioning, used primarily in outdoor applications due to moisture resistance and weathering
<b>Viscoelastic Memory Foam</b>	Good	Good	Good	High	Primarily indoor furniture cushioning, Mattresses	Widely used in the bedding industry; limited outdoor applications due to temp and humidity sensitivity
<b>Specialty Foams</b>	Variable	Variable	Variable	High	Primarily mattresses	Current main uses are in the indoor furnishing and bedding industries
<b>Blown Polyester Fiber</b>	Better	Better	Good	Low-Mid	Pillows	Great alternative to down as a pillow material
<b>Batted Polyester Fiber</b>	Better	Better	Good	Low	Furniture cushioning, Insulation	Lower cost alternative to foam for cushion seating and items requiring added support

## CONCLUSION

The number of options for cushion fill material can be daunting. Understanding the market, environment and customer expectations is critical to wading through the plethora of options available. With our experience in the development and fabrication of multiple fill programs, Easy Way Products can work with you to select the ideal fill material for your application. This service, in conjunction with our robust supply chain, allows our customers to bring a variety of high performance outdoor furnishing options to the retail consumer.

## REFERENCES

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***Easy Way Products is the premier provider of lifestyle furnishings for the retail market. From cushions and pillows to table runners and drapes, we work with you to create unique and beautiful designs to complement your outdoor furniture lines.***

For more information about our fill programs and other manufacturing capabilities, **give us a call at (513) 731-5640.**