



PERFORMANCE TEXTILES AND FABRICS: ASSESSING AND VERIFYING PRODUCT PERFORMANCE CLAIMS



EXECUTIVE SUMMARY



Performance textiles and fabrics are rapidly bringing apparel and footwear products into the 21st century. Manufacturers today are innovating at breakneck speed and bringing to the market synthetic textiles and fabrics with enhanced performance characteristics, or that feature embedded fibers or topical applications. This has led to the widespread introduction of advanced performance apparel and footwear that offer consumers new levels of comfort and safety.

At the same time, sorting through claims regarding the performance characteristics of these advanced textiles and fabrics can present real challenges for manufacturers, retailers and consumers. At a minimum, the myriad of vague, conflicting or unsubstantiated marketing claims and characterizations used to promote these materials often result in frustration and disappointment. And fraudulent representations can unnecessarily expose apparel manufacturers and retail buyers to potentially hazardous chemicals and other risks.

This UL white paper identifies some of the key performance considerations for advanced textiles and fabrics, and reviews the challenges of vague or unsubstantiated marketing claims used to promote these products. The white paper also discusses the importance of verifying performance claims, and offers an overview of UL's marketing claim verification services for performance textiles and fabrics.

BACKGROUND

Performance textiles and fabrics are generally defined as materials that have been expressly designed and produced to include or to enhance specific performance characteristics, such as increased warmth, durability or moisture resistance. These new or enhanced performance characteristics are typically achieved through the selection of specialized fibers, or the inclusion of such fibers along with natural or synthetic materials during the spinning, weaving or knitting process, or by the addition of coatings or other finishes to the finished fabric.

Textile and fabric manufacturers have employed various methods and techniques to enhance the quality and appearance of their products for centuries. But one of the earliest modern examples of performance fabrics was the introduction of the Gore-Tex® brand of fabrics in the late 1960s. In essence, Gore-Tex, a breathable membrane, is composed of an expanded form of polytetrafluoroethylene (PTFE, or more widely known as Teflon™) that prevents the infiltration of liquid water, while simultaneously allowing water vapor to pass through. These unique characteristics make Gore-Tex an ideal material for rainwear and other outdoor garments, since it results in a waterproof product that is also breathable and more comfortable to wear.

Today, modern performance fabrics available on the market offer a wide range of characteristics and capabilities. A few examples include:



- “Memory” textiles and fabrics that retain their shape regardless of use, are less prone to wrinkling, and can be laundered and worn without pressing;



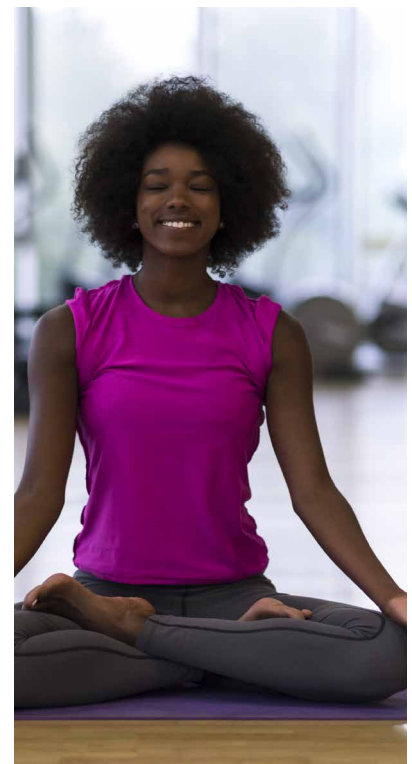
- Fabrics employed in specialized athletic wear or occupational safety garments that help protect a wearer from falls, abrasions or other anticipated dangers;



- Textiles and fabrics used in therapeutic garments, such as compression fabrics that enhance circulation, or fabrics that help to maintain suitable body temperatures;



- Textiles used in garments intended for outdoor use that provide integrated protection against ultraviolet (UV) light or insects, or that help protect against other environmental hazards.



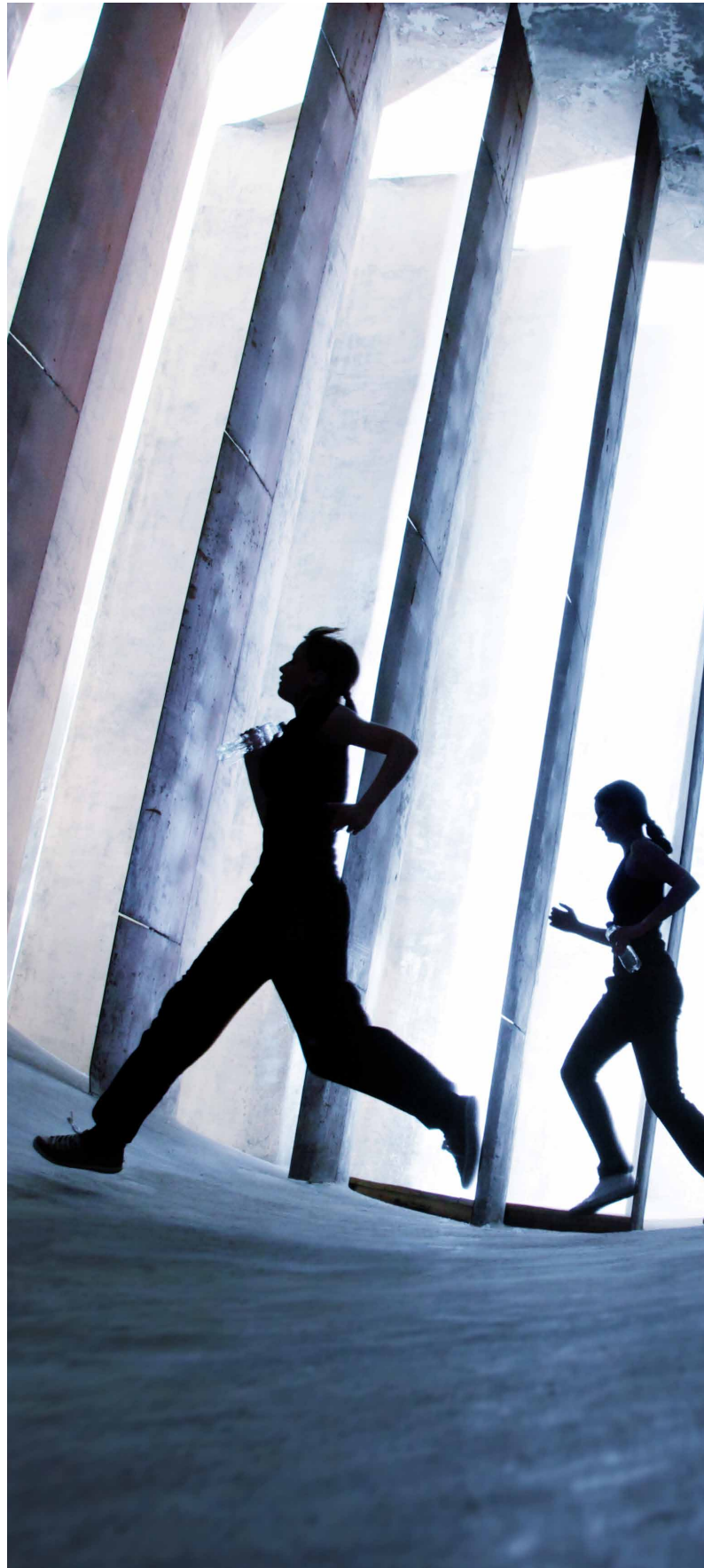
A relatively new variety of performance textiles include fabrics produced with or incorporating nanotechnology. Embedding certain types of nanoparticles into fabrics during production can provide enhanced performance characteristics, such as increased stain or odor-resistance, all without significant impact on a fabric’s weight or texture. The use of nanotechnology in the design and production of performance fabrics is expected to provide textile manufacturers with multiple paths to bring even more innovative textiles and fabrics to market in the future.

An advanced type of performance textiles and fabrics is so-called smart materials that provide unique performance capabilities through the integration of microelectronic systems, components and sensors. Even more advanced smart materials incorporate embedded communications or tracking components that enable resulting garments to transmit performance data to smart phones and tablet computers. And a new generation of “connected” smart materials may even eliminate the need for dedicated tracking devices.

TESTING FOR PERFORMANCE TEXTILES AND FABRICS

There are specific areas where the need to demonstrate compliance with mandatory specifications requires testing or some other form of assessment of performance textiles and fabrics used in various products. While requirements vary depending on the jurisdiction, regulators most often require the testing of textile-based materials in the following circumstances:

- **CHEMICAL TESTING** — As part of their environmental protection regimes, most jurisdictions have implemented restrictions or outright bans on the presence of certain, potentially harmful chemicals in product materials, including textiles and fabrics. This is most often the case with products intended for use by children and infants, but chemical restrictions are increasingly broadly applicable to all products, regardless of their intended user.
- **FLAMMABILITY TESTING** — Many jurisdictions also require flammability testing of certain products (most often, children’s sleepwear, and mattresses and other bedding products) to assess a fabric’s susceptibility to igniting and catching fire.
- **BIOCOMPATIBILITY TESTING** — Textiles, fabrics and other materials used in products designated as medical devices are often subject to additional scrutiny. Medical device components that come in contact with the skin are typically required to submit evidence of a biocompatibility assessment as part of the device review process by regulators.
- **FIBER COMPOSITION ANALYSIS** — A number of jurisdictions require that any product comprised of textiles and fabrics bear labels that disclose fiber composition and content as a condition of importation or sale. This requirement typically applies to fabrics used in apparel and footwear products, but can also apply to other consumer goods, such as soft home furnishings.



MATERIAL CHARACTERISTICS OF PERFORMANCE TEXTILES AND FABRICS

In addition to the mandatory testing and assessment previously detailed, the material characteristics of performance textiles and fabrics are often evaluated in accordance with voluntary standards developed by ASTM International,¹ industry trade associations and others. These standards detail the specifications and testing methods to be used in the evaluation of the physical, mechanical and chemical characteristics of textiles and fabrics.

Typically, the testing and evaluation of performance textiles and fabrics addresses some or all of these material characteristics:



- **DIMENSIONAL STABILITY** — Dimensional stability refers to a fabric’s ability to maintain its size under normal use over time. Dimensional stability testing helps to ensure that products made of the tested fabric continue to fit after repeated washing or dry cleaning.



- **COLORFASTNESS** — Colorfastness testing assesses the degree to which a fabric is resistant to loss of color or color deterioration, whether due to exposure to light or routine cleaning agents, or to repeated rubbing or chaffing associated with anticipated use.



- **OTHER PHYSICAL PROPERTIES** — Other physical properties for which performance textiles and fabrics are evaluated include overall strength, i.e., resistance to tearing, and pilling and abrasion resistance.



- **MOISTURE MANAGEMENT** — Among other characteristics, moisture management refers to a fabric’s ability to wick moisture away from the skin and evaporate, thereby helping to keep skin cool. Water vapor resistance testing can be an effective measure of a fabric’s moisture management capabilities.



- **ENVIRONMENTAL FACTORS** — Increasingly, textiles and fabrics are being evaluated from an environmental lifecycle perspective, reflecting the materials and methods used in their production as well as end-of-life considerations.

While performance testing of textiles and fabrics is not usually mandatory in most jurisdictions, retailers may require as a condition of procurement, evidence of compliance with specific material requirements for products made with performance textiles and fabrics.



THE CHALLENGES OF MAKING MATERIAL PERFORMANCE CLAIMS

To meet the growing demand for advanced performance textiles and fabrics, manufacturers are continuing their development efforts to bring even more innovative textile products to the market. At the same time, however, independent technical standards and testing methods may not yet be available to objectively assess some of the promised performance characteristics. And, even when relevant methodologies exist, manufacturers sometimes stop short of offering objective support for their claims since failing to do so usually carries no regulatory consequences.

As a result, manufacturers often make claims regarding the characteristics of their advanced performance textiles that may or may not hold up to independent scrutiny. Such unsubstantiated material performance claims typically fall into one of the following categories:

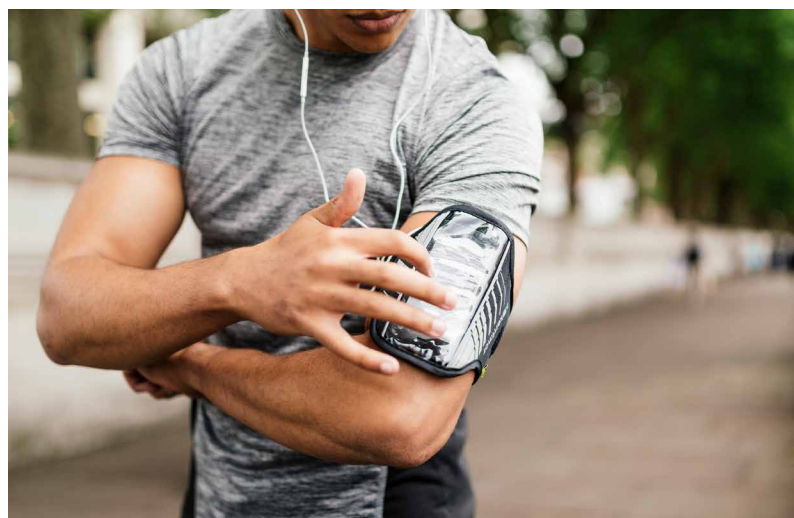
- **OBVIOUS OR SELF-EVIDENT CLAIMS** — These are claims that point to performance characteristics that are readily apparent and need no support. Examples of an obvious claim related to waterproof performance textiles and fabrics might be “keeps the body drier.”
- **CLAIMS THAT ARE VAGUE OR MISLEADING** — Vague or misleading claims tout potential benefits that may be subject to different interpretations, or which give buyers a false impression. Examples of vague or misleading claims might include “antimicrobial,” “reduces odors,” “fast drying” or “dynamic cooling.”
- **UNMEASURABLE CLAIMS** — These are claims for which there is no valid method of measurement. Examples of unmeasurable claims in textiles and fabrics could include “feels like cotton” or “leather-like.”
- **CLAIMS THAT ARE UNVERIFIED** — Unverified claims are those that could be verified or qualified by some independent methodology. For example, the claim “provides UV protection” could be verified by citing the measured ultraviolet protection factor (UPF).

Unfortunately, the use of these and other types of unsubstantiated claims in connection with the marketing and promotion of performance textiles and fabrics poses a number of potential consequences for manufacturers, as well as for apparel product companies, retailers and consumers.

Perhaps the most obvious consequence is the risk of confusing or disappointing buyers regarding the purported qualities of the performance textile or fabric products they purchase. At a minimum, disappointed buyers can be expected to reconsider future purchase decisions, or may choose to share their concerns with other buyers and manufacturers. In either case, the damage to a company's brand is likely to have unfortunate economic consequences as buyers seek more reliable vendors.

Additional, indirect consequences stemming from the use of unsubstantiated claims can include challenges from the U.S. Federal Trade Commission (FTC). The FTC is responsible for the enforcement of federal consumer protection laws that prevent fraud, deception and unfair business practices, and the agency can take enforcement action against companies that use deceptive claims in the labeling, marketing or promotion of their products. Although the FTC's enforcement efforts are focused on the protection of consumers, they can have an indirect impact on manufacturers of performance textiles and fabrics, such as in cases where fraudulent or deceptive claims made to consumers are based on a manufacturer's unsubstantiated claims.

In the same vein, manufacturers who knowingly market advanced performance textiles and fabrics that pose potential health or safety concerns may find themselves subject to legal action, including criminal sanctions and civil law suits. In addition to the cost and resources needed to mount a legal defense, the adverse publicity resulting from criminal actions or civil litigation can result in a quick and precipitous loss of market share, as buyers switch allegiances to other competing materials. Such losses can almost immediately reverse long-term efforts to build a manufacturer's hard-won reputation.



THE IMPORTANCE OF INDEPENDENT PERFORMANCE VERIFICATION

In anticipation of these potential consequences, a growing number of textile manufacturers, including many who manufacture performance textiles and fabrics, are increasingly seeking independent verification of marketing claims linked with key performance characteristics of their materials. Independent verification not only minimizes the risks associated with the use of unsubstantiated claims; it also offers manufacturers a number of market advantages, including:

- **BRINGS INCREASED CREDIBILITY TO MATERIAL PERFORMANCE CLAIMS** — Verification of material performance claims by independent third party involves a thorough and unbiased assessment of those claims against objective criteria, eliminating subjective judgements and reducing the risk of misstated claims or exaggerations.
- **DIFFERENTIATES VERIFIED MATERIALS FROM THOSE WITH SELF-DECLARED CLAIMS** — Materials whose performance claims have been independently verified by a recognized third party are more likely to be favorably viewed by buyers than materials bearing self-declared claims.
- **INCREASES BUYER CONFIDENCE AND EASES PURCHASING DECISIONS** — Similarly, independently verified material performance claims help to increase buyer confidence in the overall quality of a given textile or fabric, reducing the need for further investigation and simplifying the decision to purchase.
- **SHOWCASES A MANUFACTURER'S COMMITMENT TO TRANSPARENCY** — Finally, by taking the additional step of verifying material performance claims through an independent third party, manufacturers of performance textiles and fabrics demonstrate their commitment to producing materials of the highest quality.



UL'S MARKETING CLAIM VERIFICATION SERVICES FOR PERFORMANCE TEXTILES AND FABRICS

UL's verification services for performance textiles and fabrics supports efforts by manufacturers to independently verify marketing claims related to the performance of their materials. While UL's verification services are appropriate for all textile and fabric manufacturers, they are especially beneficial for manufacturers of innovative materials who are seeking to independently verify significant performance advantages in their products.

Based on scientifically sound, repeatable testing and evaluation methodologies, UL's verification process is expressly designed to assess the validity of specific advertising or promotional statements associated with a given product. The verification process can be applied to any marketing claim regarding performance that:

- Communicates a specific attribute or feature;
- Can be assessed in a scientifically rigorous and repeatable manner;
- Is specific and measurable against defined requirements;
- Complies with all relevant laws and regulations.

In certain cases, marketing claims that are verified under the UL verification process may be subject to review and renewal. In addition, retesting and reverification is required in cases where there are any changes to the manufacturing process, the facilities producing the product, and/or any materials used in the production of the product. And evaluations may include quality audits and inspections of those facilities involved in the manufacturing of the product.

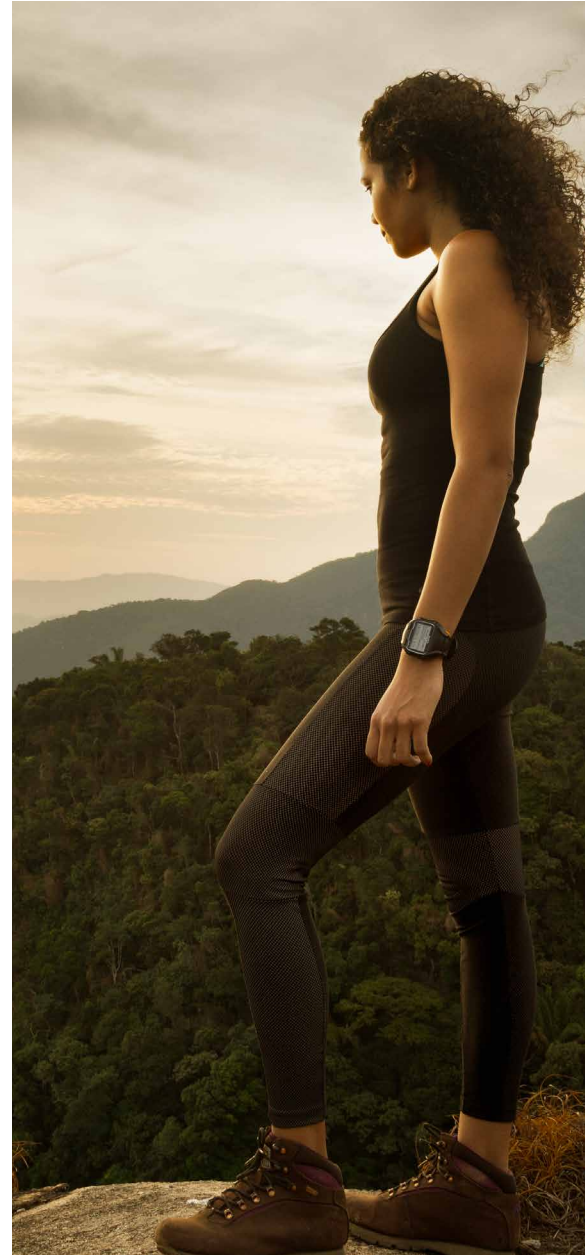
Products and materials whose marketing claims have been verified are eligible to display the UL Verified Mark. Each Mark includes a unique identifier that facilitates access to additional claims information at UL Verify, UL's publicly accessible online claims platform ([Verify.UL.com](https://www.verify.ul.com)).

It is important to note that UL's verification services is not a substitute for any material testing or certification required to demonstrate compliance with applicable regulatory requirements.

SUMMARY + CONCLUSION



The increased availability of advanced performance textiles and fabrics are helping to lead important innovations in the apparel and footwear markets. At the same time, unverified claims regarding the performance characteristics of these materials can lead to confusion and, ultimately, disappointment among buyers. Independently verified performance claims can help to increase buyer confidence in associated products, and provide manufacturers of performance textiles and fabrics with an important advantage in an increasingly competitive market.



For additional information about UL's verification services for marketing claims associated with performance textiles and fabrics, please contact QAInfo@ul.com.

END NOTES



1. See "Textile Standards," an extensive list of ASTM industry standards applicable to most aspects of textile properties, ASTM International. Web. 15 October 2017. <https://www.astm.org/Standards/textile-standards.html>.