

E-Textiles: Regulating The Future Of Fashion

Law360, New York (August 25, 2016, 4:56 PM ET) --

The last decade witnessed a dynamic change in the way that consumers research and purchase products and services. E-commerce, mobile commerce and shoppable social media have reshaped the retail landscape. We are now on the brink of a profound change in textiles, the very building blocks of apparel. Globally, in industry and academia, we are seeing the development and commercialization of smart textiles that seamlessly integrate technology into textiles. What are the legal implications of having technological components integrated into the clothes we wear?



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Textile materials are fabrics, yarns and threads. For most of human history, people made garments from natural fibers, such as cotton, wool and silk. The clothing created from these natural fibers retained all the inherent qualities of the particular fiber — cotton clothing wrinkled after washing and wool clothing was scratchy.

Starting in the late 1800s, fabric engineers in England and France began to experiment with creating artificial or manufactured fibers that performed better than natural fibers. In 1889, a French chemist started the first commercial production of a manufactured fiber using tree bark to produce cellulose. He created a semi-synthetic “artificial silk” we now know as rayon.

The next significant development in manufactured fibers occurred in the late 1930s with the creation of nylon. Nylon was considered a miracle fiber because it was synthesized completely from petrochemicals — it was the first fully manufactured fiber. In the 1960s and 70s, American consumers eagerly adopted polyester fabrics, which could be machine washed and dried and emerge wrinkle-free, without shrinkage.

Over the ensuing decades, engineers have refined manufactured fibers to improve their performance characteristics, to enhance their comfort level (i.e., microfibers in polyester), appearance, flame resistance and soil-resistant properties. We have not seen, however, the commercial production of dramatically new fabrics with advanced functionality.

The textile industry is on the brink of significant change. Engineers are rapidly producing new categories of smart textiles that seamlessly integrate technology into fabrics, yarns and threads. Smart textiles will be enabled to perform functions that have not been associated with prior generations of textiles. Functionality will be embedded in the textiles themselves. These textiles may be designed to communicate and transmit information, conduct energy, change color or detect explosives. New internet-connected fibers may contain metals, silicon and insulators — the basic elements of a computer

chip — that can be woven into conventional textiles and perform computer-like functions. Body sensors can be integrated into fabrics in order to measure such characteristics as pulse rate, breathing frequency, heart function or dehydration. Smart textiles may have medical applications, such as incorporating a drug-releasing system or monitoring health conditions, or cosmetic properties such as delivering moisturizers. Some companies have also developed conductive inks (using a variety of materials) that are flexible enough to print or bond on a textile and withstand repeated washings.

Along with their performance characteristics, however, smart textiles must also be capable of being mass produced, be comfortable and stylish to wear, washable or able to be dry cleaned, and flexible. This has been the challenge of integrating technology into textiles. Now we are seeing more companies emerge with technologies that promise both advanced functionality and commercial adaptability.

Smart textiles are distinct from wearable technology, like a Fitbit or Google Glass. Wearable technology refers to networked *devices* that are equipped with microchips, sensors and wireless communication capability and can be worn by a consumer. Smart textiles, in contrast, are fabrics, yarns and threads that can be made into a garment and be worn, or can be part of a wearable technology device, or can be used on items that are not worn (such as furniture or cars).

The commercialization of smart textiles (as well as related developments in tissue-engineered textiles) will require a reassessment of the existing laws and regulations that currently apply to apparel.

One of the broadest U.S. federal statutes affecting apparel and textile manufacturers is the Consumer Products Safety Act, which established the Consumer Products Safety Commission to regulate consumer products, including textiles, and develop uniform safety standards. The act, related laws and the commission promulgate testing, documentation and labeling standards for specific categories of manufactured goods and ban the use of certain substances. For example, rugs and carpets must meet the requisite testing standards for surface flammability. There are additional safety standards for children's clothing and products — certain labeling is required when children's sleep wear contains flammable materials and children's rugs can't exceed certain lead content limits.

What tests and certifications are necessary to ensure that smart textiles are safe to wear, perform as intended, have no hazardous substances and do not cause injury or death?

New technologies can rapidly gain consumer popularity before government agencies and legislators can regulate them adequately. For example, the Fitbit Force was the subject of a voluntary recall in 2014 because of indications that users could develop allergic reactions to materials in the product.

The Textile Fiber Products Labeling Act, the Wool Labeling Act, the Rule on Care Labeling of Textile Wearing Apparel and Certain Piece Goods, and other federal laws and regulations regulate the type and placement of labels on garments sold in the United States. Labels must list the fiber content, country of origin, manufacturer or seller, and care instructions — washing or dry cleaning. The labels must be securely attached to the garment — for shirts and other garments with neck holes, a label with the country of origin must be attached to the inside center of the neck; the other information must appear on another conspicuous label sewn into the garment. Violations of these labeling requirements result in civil penalties. And mislabeled products are deemed deceptive under the FTC rules and can be subject to FTC investigations and penalties.

But, what other types of information should be included on the labels of apparel made with smart textiles? And what kind of information should be included in the packaging that accompanies the

garment — proper use guidelines, information on data collection and data sharing?

If the garment tracks and transmits personally identifiable information, such as name, social security number or email address, about the consumer — what privacy safeguards are required?

The Federal Trade Commission addresses and enforces data privacy and security matters under its broad authority under Section 5 of the Federal Trade Commission Act, which prohibits unfair or deceptive acts or practices affecting commerce. In 2015, the FTC released its report captioned “The Internet of Things: Privacy and Security in a Connected World,” which addresses privacy concerns surrounding physical objects that are connected to the internet, including wearable technology. The report advocates certain best practices, including: security by design (building data security into a device at the outset); data minimization (collect the minimum amount of data needed), and applying the notion of notice to the consumer, followed by an opportunity for the consumer to consent, more effectively for devices that don’t have a screen by utilizing such mechanisms as a video tutorial, QR code, or consumer profile management portal.

Some commentators have suggested that the traditional notice and consent paradigm is not relevant for devices such as wearable tech due to the small size and sophistication of these products. Instead, they argue that regulation through “use restrictions” — controlling the ways in which data can be collected, used, shared and stored — is more practical and appropriate. This is a fundamental regulatory issue which needs to be appropriately addressed in the context of smart textiles — where garments are often shared with, or used by, persons other than the original consumer.

If a garment contains components which collect and share personal health information about the consumer with his or her health care provider, then the Health Insurance Portability and Accountability Act might apply. HIPAA establishes national standards, including administrative, technical and physical safeguards, to protect the privacy of individual medical records and other personal health care information and applies to health plans, health care clearinghouses, and those health care providers that conduct certain health care transactions electronically.

If a garment has a medical or health aspect to its functionality, it might be regulated by the U.S. Food and Drug Administration as a medical device. The scope of the FDA’s regulatory authority in this area is currently unclear. On July 29, 2016, the FDA issued nonbinding recommendations to industry in a guidance entitled “General Wellness: Policy for Low Risk Devices Guidance for Industry and Food and Drug Administration Staff.” The guidance is intended to provide clarity with respect to the Center for Devices and Radiological Health’s policy regarding general wellness products (as opposed to drugs, cosmetics, biologics and certain other regulated products). The guidance indicated that the center did not intend to examine products that (i) are intended only for general wellness use (as defined in the guidance) and (ii) present a low risk to the safety of users and other persons, to determine whether they are devices within the meaning of the Food, Drug and Cosmetics Act or, if they are such devices, whether they were compliant with the regulatory requirements for devices under such act. The guidance provides specific examples of general wellness products as compared to those products intended for treatment of specific diseases.

Of course, in addition to U.S. federal regulation, there are laws and regulations in individual states and foreign jurisdictions that apply to the manufacture and sale of apparel in those jurisdictions.

Smart textiles promise to improve the quality of our lives by making our lives easier, more connected and healthier. However, these exciting textile developments will inevitably raise concerns about efficacy,

safety and security. Each new textile technology needs to be thoroughly understood and evaluated in the context of applicable law. And current laws and regulations may need to be analyzed and then modified to reflect the new realities of smart textiles.

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