SMART FABRICS

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(07C01A0402)
WHAT IS SMART FABRIC?

Smart and intelligent textile. There is a substantive difference between the terms, Smart and Intelligent, Smart materials or textiles can be defined as the materials and structures which have sense or can sense the environmental conditions or stimuli, whereas intelligent textiles can be defined as textile structures which not only can sense but can also react and respond to environmental conditions or stimuli. These stimuli as well as response, could be thermal, chemical, mechanical, electric, magnetic or from other source.
TYPES OF SMART FABRICS

- **Passive Smart**: Where the clothing "reads" or senses the environment or something about the person wearing the clothing. Wearable sensors fall into this category, with examples including built-in GPS, clothing-integrated baby breathing monitors, and clothing that gives feedback about potential changes in weather.

- **Active Smart**: Where clothing not only senses the environment, but also reacts to it. Examples include: Clothing that changes density depending on the temperature outside, jackets that store solar energy that can be used to charge cell phones and cameras, and even built-in sensors that can guide pinpoint massage to a wearer that is regulated depending on his or her level of stress.

- **Active very smart**: Where clothing has built in computing and or intelligent sensing capacity. Examples include sleeves that function as keyboards for a small handheld device, clothing that can function like a powerful calculator and shirts that can store information through a built-in fabric keyboard and send it via Bluetooth to a computer.
Examples of types of fabrics
OTHER CLASSIFICATION IN SMART FABRICS

Other classifications of intelligent clothing include "phase change" and "shape memory" materials. Phase change materials literally change aspects such as their density in reaction to the environment, in order to increase comfort or functionality to the wearer. These clothes might become denser when it is cold and more porous when it is hot, for example. Shape memory materials can change from a temporary deformed shape back to an original shape. They can preserve a comfortable and loose fit regardless of changes in heat and moisture levels.
MATERIALS USED

For years the textile industry has been weaving metallic yarns into fabrics for decorative purposes. The first conductive fabric we explored was silk organza which contains two types of fibers, as seen in Figure 1. On the warp is a plain silk thread. Running in the other direction on the weft is a silk thread wrapped in thin copper foil. This metallic yarn is prepared just like twisted telephone wire, and is highly conductive. The silk fiber core has a high tensile strength and can withstand high temperatures, allowing the yarn to be sewn or embroidered with industrial machinery. The spacing between these fibers also permits them to be individually addressed, so a strip of this fabric can function like a ribbon cable. This sort of cloth has been woven in India for at least a century, for ornamental purposes, using silver, gold, and other metals.
Different smart fabric materials
Elements used in smart fabrics