SILICONE TEXTURED FABRIC TEXTILE FEEL

FIELD OF INVENTION

The present invention relates to a high volume, mass manufacturable process to create the tactile surface feel of real textile or fabric using silicone substrate (or equivalent elastomeric polymer) via laser texturing.

BACKGROUND OF THE INVENTION

Traditional fabric / textile has many usages and applications, including medical-related products and applications. Some of the traditional fabric / textiles are for single-use applications and may not be able to re-use frequently or have a limited lifespan of usage even after washing. In addition, continuous washing of fabric / textile will have wear and tear on the yarn. Hence it is more sustainable to produce a longer product life cycle via an injection molded silicone (or equivalent elastomeric polymer) with a laser textured surface that simulates a fabric soft feel.

The present invention aims to solve this problem by having a process to create the tactile surface feel of real textile or fabric using silicone (or equivalent elastomeric substitute) via laser texturing. Real fabric / textiles are being referenced. Silicone material was chosen as it is suitable for medical and biomedical applications due to its inert properties to chemicals. Elastomeric polymers can also be utilised using the same process. Samples of such real fabric / textiles are collected and studied under magnification in order to understand the different fabric / textiles patterns, weaving structures, its weaved shapes etc. The patterns from these fabric textiles are then scanned out as images, followed by transferring of such modified images into a unique software algorithm. This particular software will be programmed into a laser etching machine which will control the laser pitching and intensity in order to etch the simulated pattern onto prescribed metal inserts. The use of laser texturing with a software

program enables control of the laser to modify the surface texture of a material, be it polymer or metal, etc. as such by depositing variable amounts of laser energy onto the surface of a material in an extremely controlled manner. The software with its unique algorithm is able to modify the surface texture of the insert material accordingly to any pattern of fabric identified. In order to get the closest fabric / textile feel of the molded material, the scanned images can also be modified using the appropriate CAD software such that the appropriate depth and width of each individual shape can be adjusted appropriately. Once modified, these modified images are then loaded back onto the laser etching machine

For the present invention, tooling inserts will have to be specially fabricated and "treated" before the laser texturing process. The scanned images of the selected fabric textiles can then be uploaded onto the laser etching machine, followed by the actual laser texturing process on the tooling insert. The parameters for the laser texturing have to be adjusted accordingly so as to achieve the desired type of output that the laser textured material is going to exhibit. Such parameters include controlling the laser power setting, the moving speed of the laser toolhead, number of laser cutting passes and the scanning frequency. The scanned images that are uploaded onto the laser etching machine are then converted to the necessary file format suitable for the laser etching machine so that the tooling insert will be laser textured out with the same scanned images. This entire process is repeated for other textiles / fabrics with different patterns and weaving structures so that different images can be captured, scanned and uploaded onto the laser etching machine in order to produce tool inserts with different laser textured patterns/weaves to simulate the selected fabric pattern.

Once the tool inserts are laser textured based on the scanned fabric / textile images, these tool inserts are then loaded onto compression molding machine or injection molding presses in order to compression mold or injection mold the polymeric material,

i.e., silicone (or equivalent elastomeric material) onto the textured tool insert so as to mold out the material with silicone / equivalent elastomeric textured fabric / textile feel. Different images from different textile / fabric will enable the molded material to have many different silicone / equivalent elastomeric textured fabric / textile feel. The entire process is repeated again as previously described with the different textile / fabric images, followed by laser texturing the tool inserts before sending it for compression or injection molding of the silicone / elastomeric material onto the tool.

BRIEF DESCRIPTION OF THE DRAWINGS

The drawings attached here are to aid comprehension of the description of the invention here. The drawings are not to scale and they are to be used for merely illustrating the principles and concepts of the invention only.

To aid in comprehension of the invention, the drawings are separated into the various Figures as described below:

Figure 1A and 2A illustrates a closed-up view of two (2) different typical fabric texture under magnification for the embodiment of the present invention.

Figure 1B and 2B illustrates a closed-up view of two (2) different typical fabric pattern that was scanned out under magnification for the embodiment of the present invention.

Figure 3 illustrates a closed-up magnification of the laser-textured silicone when viewed under scope.

Figure 4 illustrates a perspective view of the tool insert laser textured with a typical fabric pattern.

Reference numbers

1	Fabric texture under magnification
2	Fabric pattern under magnification
3	Another fabric texture under magnification
4	Laser Textured Silicone under magnification
aa	Pitches
bb	Depth
5	Lasered tool insert

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT OF THE PRESENT INVENTION

In the following description, details and drawings are provided to describe the embodiment of the application.

The present invention is applicable on product design that requires fabric treatment on the product surface but due to certain design intention, it is not sustainable to have fabric. Hence a silicone (or equivalent elastomeric material) simulated fabric surface area will be most applicable. This silicone / elastomeric surface area textured to feel like textile is chemically inert and high temperature resistant. For certain product design and engineering functions, this is very useful and relevant.

Figure 1A and **2A** illustrates a closed-up view of two (2) different typical fabric textures under magnification for the embodiment of the present invention. A typical fabric texture is denoted as **1**. For comparison purposes, **Figure 1A** and **2A** are placed side by side to illustrate that different fabric has different fabric texture and shapes. With different fabric texture and shapes, it gives rise to different tactile surface feel upon touching. Besides the typical fabric texture denoted as **1**, one can collect more sample of such real fabric / textile. Each of this sample fabric / textile is then put under magnification in order to study, understand and compare the different fabric / textiles patterns, weaving structures, its weaved shapes etc. The patterns from these fabric textiles are then scanned out as images, such as the one denoted as **2** as illustrated in **Figure 1B** and **2B**. **Figure 1B** and **2B** corresponds to **Figure 1A** and **2A**, whereby **Figure 1B** and **2B** illustrates a closed-up view of two (2) different typical fabric pattern that were scanned out under magnification for the embodiment of the present invention. This is then followed by transferring of such scanned images via a unique software algorithm which is programmed into the laser etching machine so as to laser textured

on the tooling inserts needed to mold out the silicone / elastomeric textured material via compression or injection molding.

Figure 3 illustrates a closed-up magnification of the laser-textured silicone (or equivalent elastomeric material) denoted as **4** when viewed under scope, belonging to another fabric texture denoted as **3**. As illustrated in **Figure 3**, the portion denoted as **4** consists of different "hills and valleys" kind of shape. By adjusting the pitches (denoted as "**aa"** in **Figure 3**) and the depth (denoted as "**bb"** in **Figure 3**) for each shape using special CAD software, one can control the fabric / textile feel of the molded material.

Figure 4 illustrates a perspective view of the tool insert denoted as **5** which is laser textured with a typical fabric pattern, whereby an example of a textured fabric pattern is denoted as **2** in **Figure 4**. Different images from different textile / fabric will enable the molded material to have many different silicone (or equivalent elastomeric material) textured fabric / textile feel. In order to obtain the closest fabric / textile feel of the molded material, the scanned images can also be modified using the appropriate CAD software such that the appropriate depth and width of each individual shape can be adjusted appropriately. Once the images are modified or edited, these modified or edited images are then loaded back onto the laser etching machine, followed by laser texturing on the tooling inserts needed to compression or injection mold out the silicone (or equivalent elastomeric) textured material.

While what has been described hereinabove is the preferred embodiment of the invention, those skilled in the art will understand that numerous modifications may be made without departing from the spirit and scope of the invention. The embodiments described herein are meant to be illustrative only and should not be taken as limiting the invention, which can be expressly set forth in the following claims.

CLAIMS

What is claimed is:

1. A method of compression or injection molding a material comprising of:
   (a) Silicone or equivalent elastomeric material that has textile / fabric tactile surface feel wherein
   (b) the real textile / fabric is being referenced in terms of its weaving shapes and patterns (under magnification); followed by
   (c) Choosing the selected textile / fabric with the unique weaving shapes and patterns; followed by
   (d) Scanning the selected weaving shape / patterns; followed by
   (e) Modifying or editing the selected fabric images using special CAD software; followed by
   (f) Loading the images via a unique software algorithm whereby this particular software programs and controls the laser etching machine which will then control the laser pitching and intensity; followed by
   (g) Laser texturing the selected images onto the relevant tool insert specially fabricated and “treated”; followed by
   (h) Compression or injection molding the silicone / equivalent elastomeric material onto the textured tool insert, wherein
   (i) The final result will be a silicone / equivalent elastomeric polymer molded piece that feels like fabric.