www.lemur-italy.com

muriel®-sensor

muriel®-sensor is a conductive silicone rubber filament with a changing resistance as function of elongation. Thanks to the patented Lemur production system a controlled, constant thickness and a regular cross-section of the yarn (Figure 1) can be achieved, hence granting a homogeneous response of the conductive filament over long distances and among the various produced batches.

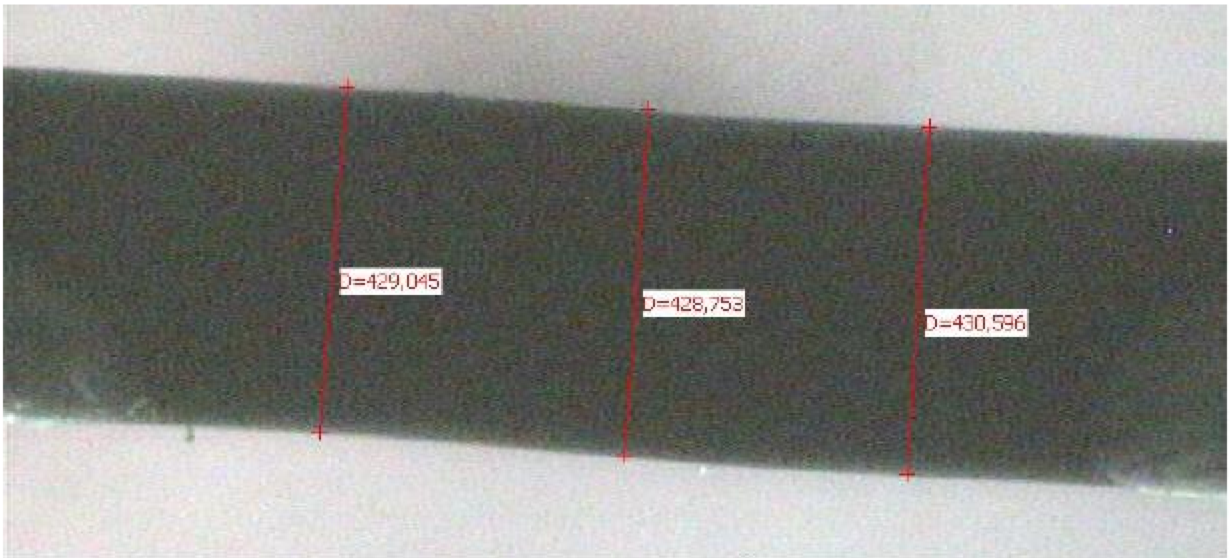

Figure 1: Optical microscope image of a 2000 dtex muriel®-sensor filament (diameters, D, are reported in microns).

It is possible to produce yarns with the desired fiber diameter that can vary over a wide range of values: from 1.500 dtex, corresponding to a diameter of about 370 ●m, (on request it is possible to obtain even thinner diameters), up to 10.000 dtex or more, corresponding to a diameter of 1 mm or more.

With good tensile strength (close to 6 MPa, Figure 2) and elongation at break (more than 300 %), this elastic yarn is characterized by its low electrical resistivity (less than 2 Ohm x cm) obtained by adding a high conductivity carbon black to the silicone rubber. This conductive filler forms a continuous network within the rubbery matrix that allows efficient electronic conduction even under an intense strain of the filament. In particular, the electric response is linearly proportional to the filament elongation (Figure 3) within an ample range of deformation. This means that the *muriel®-sensor* filaments can be easily interconnected with any electronic transducing device allowing continuous and reliable control of stress-strain process under investigation. Furthermore, this linear resistance increase, as related to deformation, is perfectly reversible and has been tested over a large number of elongation / relaxation cycles, demonstrating a good stability and reliability over time.

The material has been tested also relatively to possible ageing effects. During a two years period of storage at standard condition (room temperature and humidity) no alteration of electrical or mechanical properties has been noticed, demonstrating the effectiveness of the producing process and the reliability of the material.

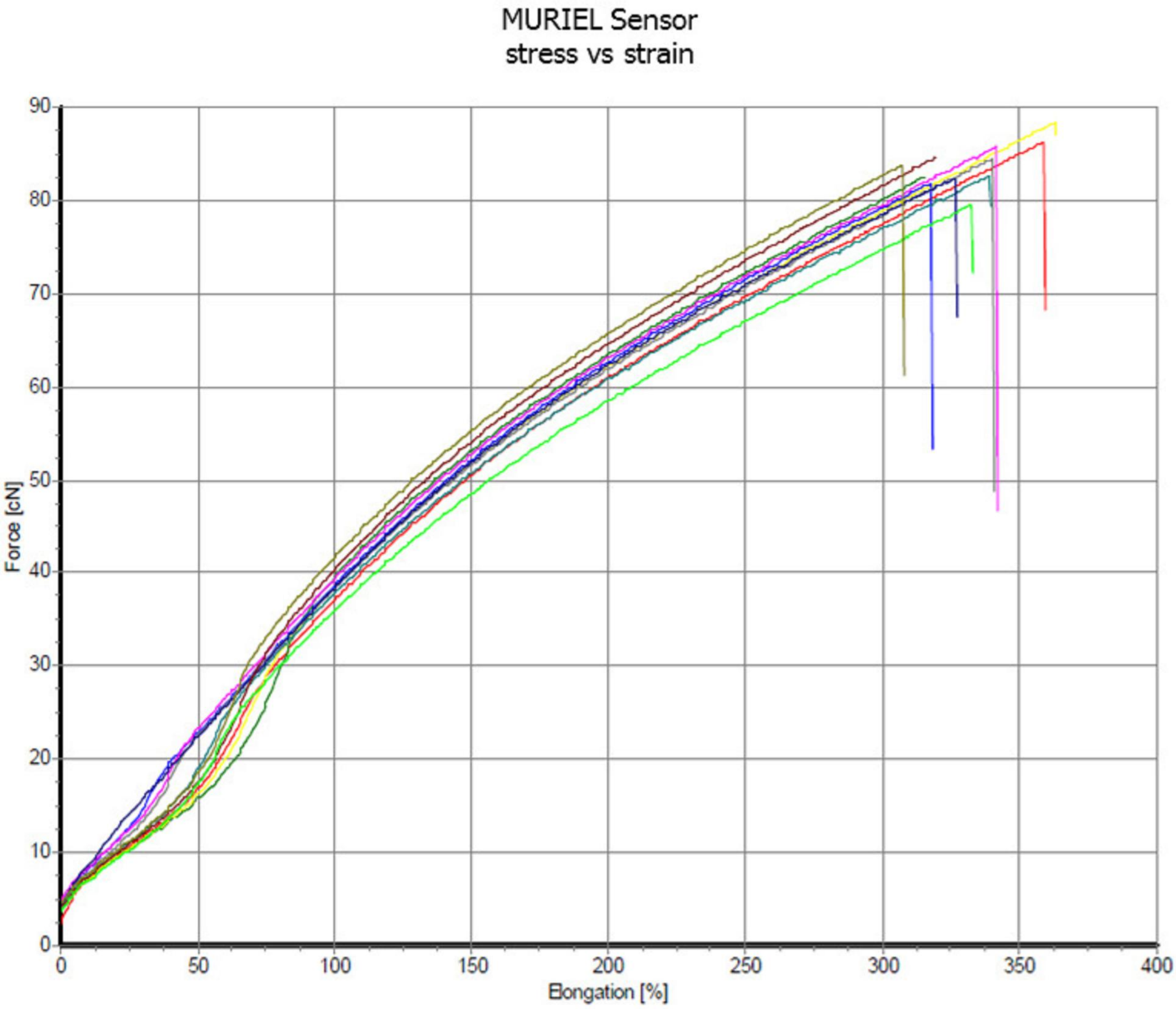

Figure 2: Stress-strain test on 2000 dTex filament of muriel®-sensor.

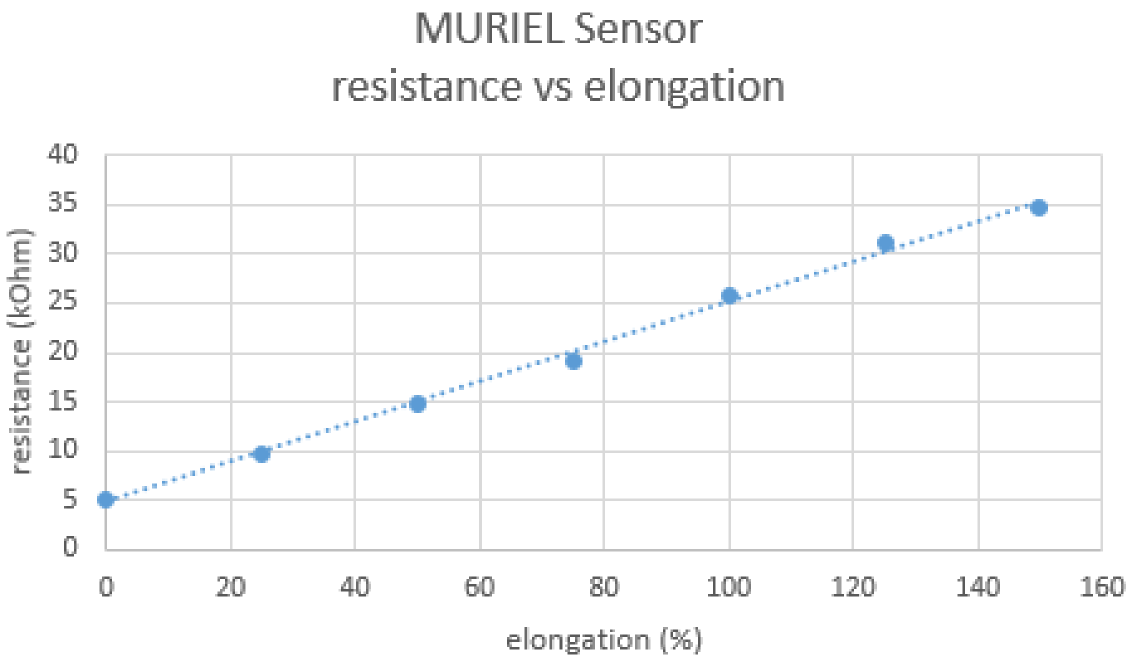

Figure 3: Resistance variation as function of filament elongation for a 2000 dtex muriel®-sensor strand (initial length 50 mm).

All these peculiar characteristics means that *muriel®-sensor* can find a broad range of applications as a sensor component to monitor deformations, static or rapidly changing over time, with a fast responsiveness and reliability over a wide range of temperature. Over short distance, it can found applications also as an elastic electrical cable allowing for movements with a high degree of adaptability and without constrains.

For special applications, it is potentially possible to produce a core-shell yarn with an insulating top coating that protect and electrically insulate the internal core made of the conductive *muriel®-sensor* filament.

www.lemur-italy.com
email: info@lemur-italy.com