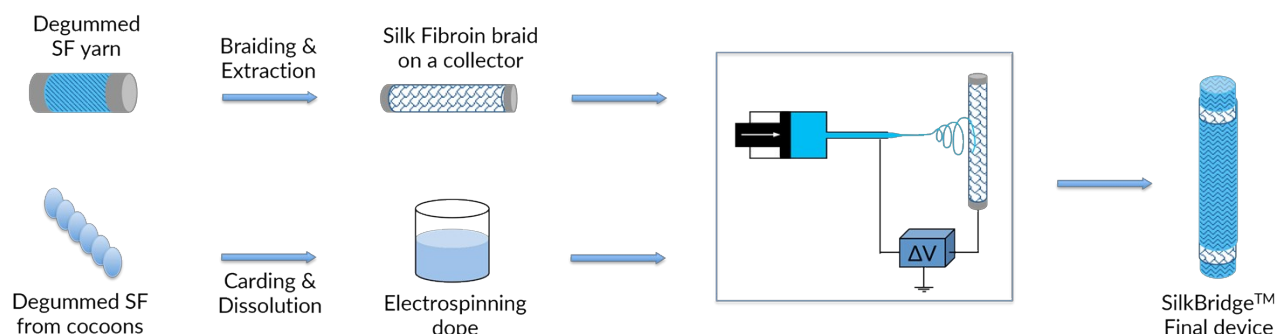
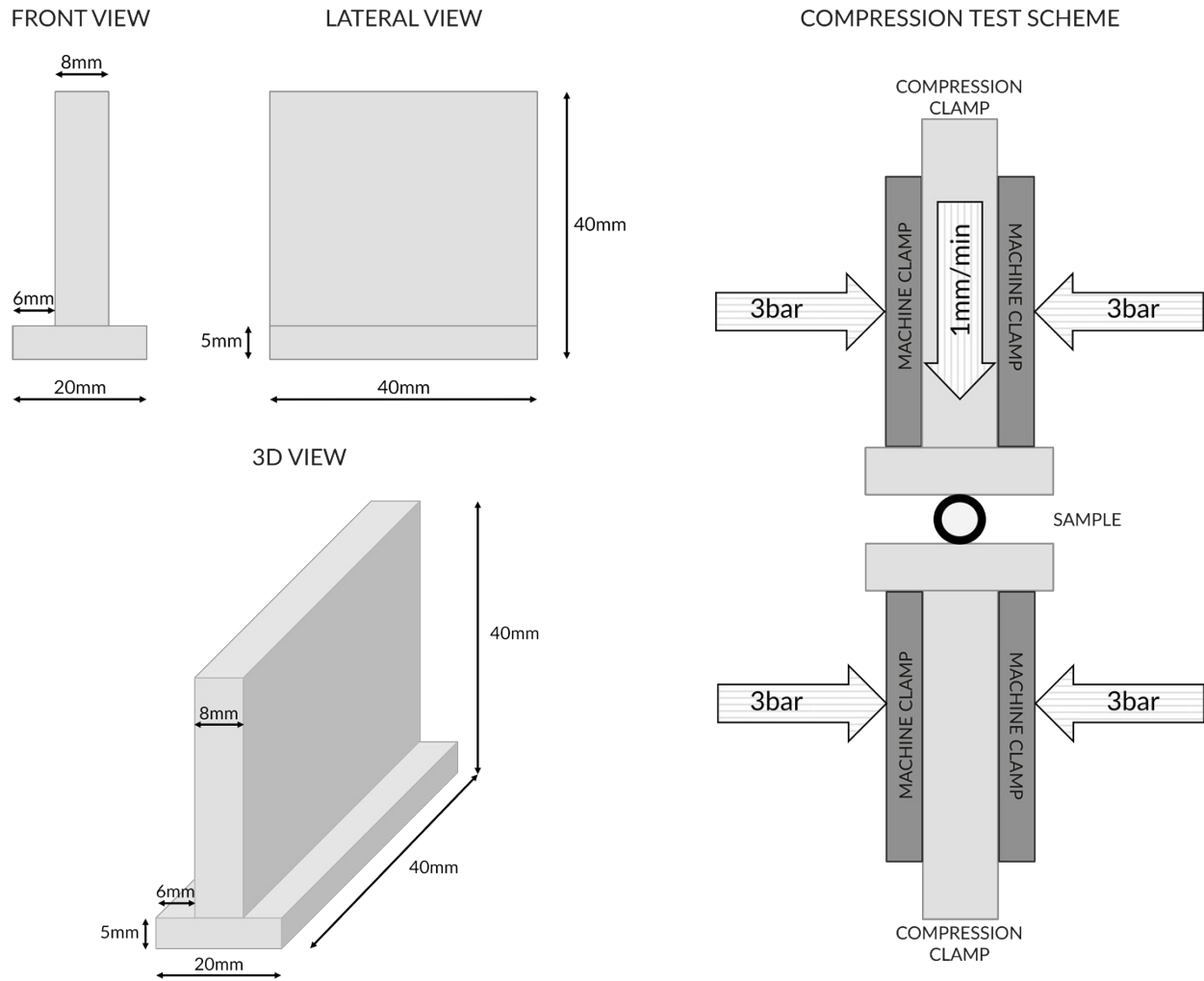


SUPPLEMENTARY MATERIALS



Scheme S1. Manufacturing flowchart of SilkBridge™.

SilkBridge™ is made from two different sources of silk fibroin: degummed silk yarn (top line, left) and silk cocoons (bottom line, left). Both yarn and cocoons are acquired from external suppliers and checked internally for quality. The degummed silk yarn is braided in tubular shape by needle braiding and then purified by methanol Soxhlet extraction (TEX layer). Cocoons are degummed to remove sericin. The pure silk fibroin thus obtained is dissolved in Lithium Bromide 9.3 M and dialyzed against distilled water. The aqueous silk fibroin solution is cast to obtain pure silk fibroin films, which are dissolved in formic acid for the preparation of the electrospinning dope (silk fibroin concentration: 8% w/v). Inner and outer ES layers of the tubular device are built onto the two surfaces of the TEX layer assembled on a mandrel. Before electrospinning, each surface of the TEX layer is coated with a solution of ionic liquid (1-ethyl-3-methylimidazolium acetate; EMIMAc) in distilled water (80:20 v/v). Procedural details of this manufacturing step are still under patenting and cannot be fully disclosed. After the deposition of each ES layer, the tubular structure is consolidated with aqueous ethanol (80% vol), washed with water overnight, dried and checked for quality. The final three-layered ES-TEX-ES tubular scaffold is finally purified with ethanol by microwave assisted extraction, packaged in double pouches under laminar flow cabinet and sterilized with ethylene oxide (EtO).



Scheme S2. Technical details of the grips used for compression tests.

Technical drawing showing the dimensions of the Aluminum-made T-shaped device designed and used for the compression tests (left). The T-shaped devices are clamped in the upper and lower tensile machine grips (right). The sample under testing is placed onto the surface of the lower grip, and then the upper grip is moved down until it comes into close contact with the sample. Then, grips with sample inside are fully immersed in the thermostatic water bath at 37°C and the compression cycle is started after a conditioning period of 5 min.