

## Esenca Sizing, When Size Actually Matters

Eduard COJOCEA  
Esenca Sizing, Bucharest, Romania

### Abstract

In this work, we present results from four validation studies of the Esenca Sizing body measurement solutions across diverse application domains.

The first study, conducted in collaboration with Essity, focused on precise leg measurements for compression socks, a use case demanding sub-centimeter accuracy. Measurement repeatability showed an average circumference variation of  $\pm 3$  mm, while 91.4% of all measurements had an absolute error below 7.5 mm and 64.7% below 5 mm when compared to ground truth data for ankle circumference (cB).

The second study, commissioned by Esenca, involved 92 participants who were measured both with the Esenca Sizing solution and a professional 3D body scanner. When comparing results, the mean absolute error was 2.21 cm for chest circumference and 1.77 cm for waist circumference, confirming strong agreement between the two measurement systems across users with varying body types.

A third study, performed in collaboration with medical doctors, analyzed data from 71 participants to investigate correlations between anthropometric parameters and health indicators. The waist and bottom circumferences, measured with mean absolute errors of 2.98 cm and 1.85 cm, respectively, were found to correlate with key metabolic risk factors, including elevated blood pressure and blood glucose levels.

A 4th study, in partnership with Lavans, we evaluated workwear applications by measuring 150 employees using the Esenca Sizing solution. Each participant received garments directly based on the system's recommendations and tried them on at home. The resulting recommendation accuracy reached 91%, confirming reliable performance and reduced bias in real-world deployment conditions.

Finally, a benchmark was conducted for the Esenca hand measurement solution, which demonstrated high consistency and precision. When measuring the same user multiple times, the average spread across finger circumferences was 2.4 mm, with a mean absolute error of 1.5 mm compared to ground truth data.