

Ferrino Hikemaster Line with Auxetic Technology



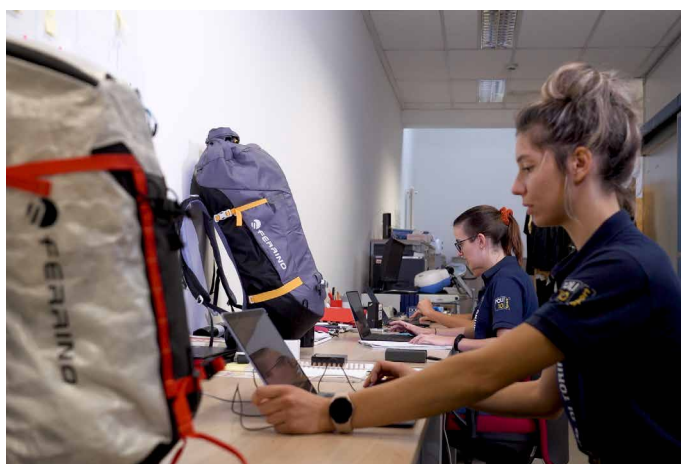
Design project aims

- 1** To improve thermal and ergonomic comfort for hiking backpack
- 2** To increase the wellness of users, thanks to the reduction of the metabolic costs of physical activity.



Work team

A three-year partnership between the R&D team at Ferrino, Comfort Lab in Città Studi Biella and the Sport Technology Lab in Bologna (University of Bologna).

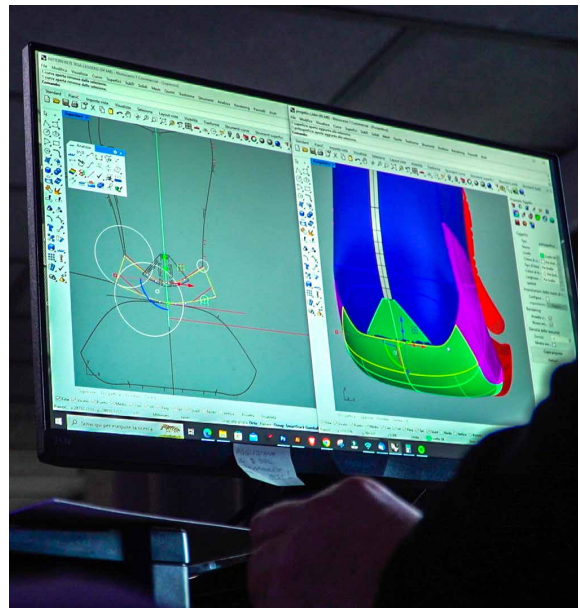
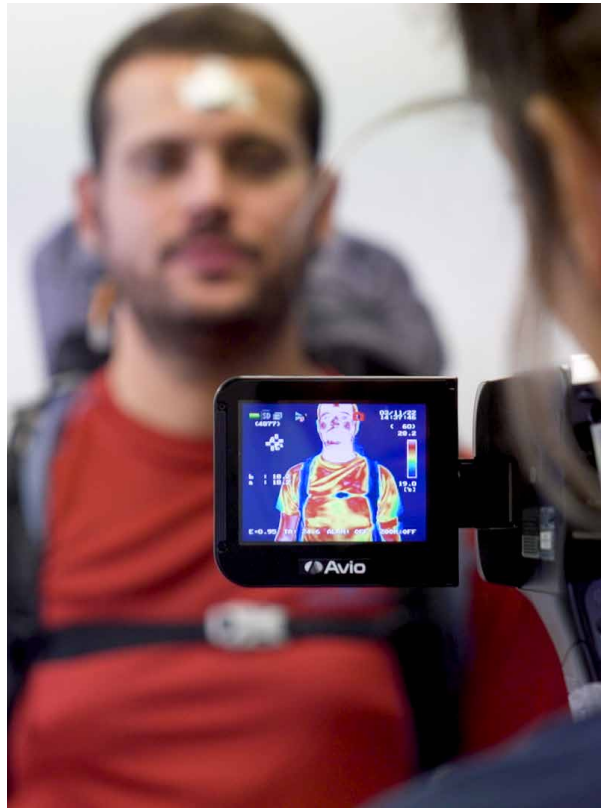


Laboratory tests

- 1 Implementation of laboratory tests in the product development stage to use objective data to assess proposed solution validity.
- 2 Backpack performance has been tested in a climate chamber under controlled environmental and physical stress conditions to assess a series of physiological parameters that show the metabolic costs of physical activity: temperature, moisture, sweating.

Tests in climate chamber

- The environmental conditions were as follows: air temperature (T_a) $23.4 \pm 0.4^\circ\text{C}$ and relative humidity (RH_a) 47.4 ± 0.8 .
- The tests were performed on 10 subjects, 5 women and 5 men. Backpacks loaded with 20% of the body weight of the tester, who was then subject to physical activity for 50 minutes.
- Assessment of thermal comfort: temperature and moisture detected using sensors positioned on the tester's body and on the backpack.
- Surface temperature of testers and backpack at the end of the test, using thermographic surveys.
- Weight of testers and backpack before and after activity to assess sweat loss and residual sweat.
- Questionnaire given to testers to survey their subjective feelings and of temperature and moisture.





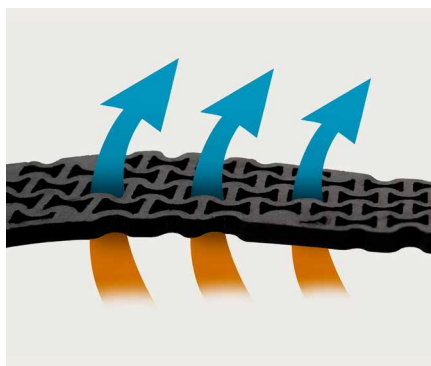
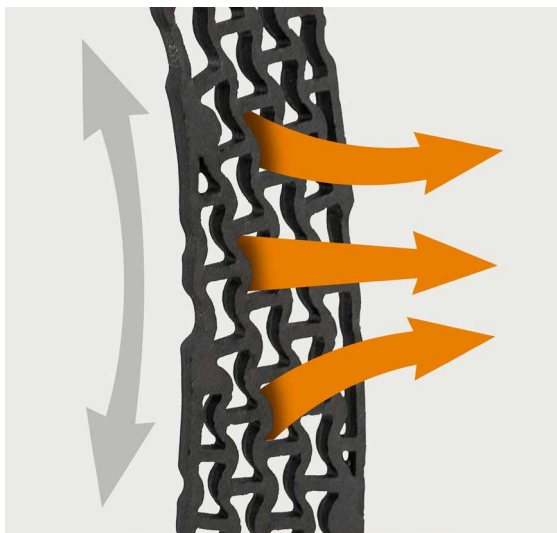
Solution

Make the shoulder straps on the new line of Hikemaster backpacks in auxetic material

Auxetic materials are characterised by a negative Poisson coefficient, subjected to traction, they tend to expand.

Making shoulder straps in these materials can offer the following advantages:

- Increased breathability
- Increased thermal comfort
- More even load distribution
- + 10% evaporation compared to traditional shoulder straps
- Increased heat expulsion efficiency



+10% evaporation
compared to traditional shoulder straps



Hikemaster 26



Hikemaster 24W