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DIF-Jacket – Development of an innovative firefighter jacket

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AREA AND APPLICABLE TOPICS

☐ Sustainability and Circular Economy
☐ Digitalization and Industry 4.0
☒ Performance
☐ Health and Well-being

ABSTRACT

The project DIF-Jacket [LINK 1] combines a multidisciplinary team (CEFT, CeNTI and CITEVE) that intends to develop an innovative firefighter jacket following a procedure based in numerical models to optimize the design and performance. The team aims to study the performance of the new firefighter jacket in a range of scenarios observed in Portuguese fires, with special emphasis on their transient nature.

The jacket will be based on a combination of protective clothing components, creating a multilayer structure. Emerging as well as commercially available textile structures and solutions for incorporation on firefighter garments has been considered to improve thermal management. Functionalization of existing materials with innovative solutions and formulations were also carried out. Characterization of these materials, regarding thermophysiological properties has been studied as experimental studies to explore thermal management.

Moreover, a numerical tool was developed to study several parameters either with potential to enhance the jacket performance, such as the use of phase change materials [1] and different jacket designs, or possible drawbacks related with the water distribution along the jacket multilayers; considering different types of selection criteria (e.g., skin damage, firefighter thermal state).

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REFERENCES

[LINK 1] https://difjacketproject.fe.up.pt/

[1] A. Fonseca, S.F. Neves, J.B.L.M. Campos, Thermal performance of a PCM firefighting suit considering transient periods of fire exposure, post – fire exposure and resting phases, Appl. Therm. Eng. 182 (2021) 115769. https://doi.org/10.1016/j.applthermaleng.2020.115769.