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RECYCLING OF HIGH-PERFORMANCE BALLISTIC FIBERS AS PART OF SUSTAINABLE MANAGEMENT CAPABILITY FOR MILITARY PERSONAL PROTECTIVE EQUIPMENT

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Introduction: Ultra-high molecular weight polyethylene (UHMWPE) fibers (Fig.1) are high-performance ballistic materials that have attracted significant interest due to their wide-ranging applications in the Armed Forces, law enforcement and personal security [1].

Recycling of high-performance ballistic fibers is part of sustainable management capability for military personal protective equipment in the compliance from the Armed Forces with the environmental requirements imposed on them by The EU' climate change and defence roadmap, which is an integral part of the EU's overall efforts to tackle climate change under the European Green Deal.

Reusing and recycling products reduces the need to extract natural resources and limits the associated damage to ecosystems that threaten biodiversity.

The circular economy also contributes to the reduction of greenhouse gas emissions.

Moving to reliable products that can be reused, improved and repaired lead to less waste.

Recycling raw materials reduces the risks associated with their procurement –the EU becomes less dependent on global crises, price changes and geopolitical pressures [2].

Experimental part: The method for recycling products containing polyethylene fibers with an ultra-high molecular weight, retain the advantageous characteristics of the fibers [8].

Results: Products made up of the recycle UHMWPE are characterized by great functional, mechanical and esthetic advantages [8].

Discussion: Practice shows that recycled UHMWPE fibers can be successfully used as raw materials for the production of new non-ballistic products, thus respecting the principles of sustainability.

Conclusion: From the recycled UHMWPE fibers can be produced: clothing, gloves, protectors, flooring, elements for making renewable energy sources and others.

Keywords: *High-performance ballistic materials, Ultra-high molecular weight polyethylene (UHMWPE) fibers, Military personal protective equipment, Sustainable management, Armed Forces, the EU' climate change and defence roadmap*