

## PROTECTIVE CAMOUFLAGE EQUIPMENT IN TEMPERATE CONTINENTAL CLIMATE AREAS

**Mariya Georgieva, Petya Gencheva**

Defense institute “Professor Tzvetan Lazarov”, 1592 Sofia,

Professor Tzvetan Lazarov blvd.

m.georgieva@di.mod.bg, p.gencheva@di.mod.bg

Ensuring national and global security, especially in the context of increasing global conflicts, brings into sharp focus the critical issue of protecting military personnel on the battlefield. Modern military conflicts require the implementation of measures that ensure safety, communication, comfort, and maintain the effectiveness of military apparel. In this context, the integration of smart and multifunctional textiles, next-generation materials, and systems with diverse properties plays a crucial role in providing protection and comfort to military personnel during combat operations and training. Equally important is the need to provide reliable camouflage gear for various climate zones, as well as the selection of fabrics and systems that ensure comfort in different climatic conditions.

This article reviews protective camouflage equipment designed for temperate continental climates. Military gear must provide effective protection and concealment amid seasonal changes, including varying temperatures, humidity, and shifts in natural hues. The color palette typically features shades of green, brown, yellow, and gray, reflecting nature’s transformations—from the lush green forests of late spring and summer to the brown leaves of autumn and the bare trees of winter. Camouflage patterns are selected based on climatic zones to adapt appearance and materials to different environmental elements across seasons. The equipment should balance durability, strength, and lightweight design while ensuring thermal comfort and protection against rain, snow, and wind. Military clothing must enable physically demanding tasks while maintaining endurance and mobility. Functional textiles enhance garments with properties such as mechanical resistance, water and dirt repellency, fire resistance, antibacterial features, and UV protection. Smart and multifunctional textiles create opportunities for high-tech garments that integrate multiple functions. In addition to camouflage, the gear often includes thermal protection for varying temperatures and noise reduction during movement. This equipment is essential for operations in temperate continental regions, ensuring effective concealment in changing conditions. To create military gear for a temperate continental climate, it is important to conduct tests for each of the climate’s characteristics to ensure protection of the fighter’s body from both freezing and overheating. The CLO rating has been introduced to determine the ergonomic comfort of each piece of equipment, helping to measure the thermal insulation properties of clothing. The standard used for measuring the thermal insulation properties of clothing with the CLO rating is BDS EN ISO 9920:2009 “Ergonomics of the Thermal Environment. Assessment of Thermal Insulation and Evaporative Resistance of Clothing Ensembles.” This standard introduces methods for evaluating the thermal insulation and evaporative resistance of clothing, as well as measuring the insulation properties in various layers and combinations of clothing, using both static and dynamic testing methods. It is suitable for researching thermal comfort in work environments, sports, and everyday clothing use. The standard shows how well a given garment or layer of clothing can retain body heat and provide comfort in cold conditions. The higher the CLO rating, the better the insulation of the clothing. One CLO (from “clothing”) is defined as the amount of insulation required to keep a person seated in an environment with a temperature of around 21°C with minimal physical activity, in comfort.

**Keywords:** *Equipment, temperate continental climate, field combat uniform.*