



The **New-Generation Protective Suit EOD ONE** is designed to provide engineering units and pyrotechnic forces (subordinate to the Ministry of National Defense and the Ministry of Interior and Administration) with complete personal protection when performing direct activities related, in particular, to neutralization of explosives.

The Suit provides **maximum, synergistic protection** against the factors acting during an explosion, i.e.: **from fragments, heat wave and shock wave (action of the peak pressure of the explosion wave), which is a product innovation on a global scale¹.**

The developed Suit is the **first fully Polish** product solution, which at the same time exceeds the current solutions on the international market.

Features of EOD ONE Suit:

- Made of the highest quality materials, featuring great mechanical resistance and safety parameters.
- The Suit's unique design greatly reduces the impact of the shock wave / pressure.
- The design of the Suit ensures easy and intuitive use.
- Freedom of movement and a high level of ergonomics of use, with a high level of ballistic protection.

¹ Currently, there are no design solutions on the market with documented confirmation of the above-mentioned functional feature in terms of a test simulating the actual conditions of use (standing position, kneeling position), i.e. when the explosive is located directly on the ground level).



Features of EOD ONE Protective Suit -cont.:

- System for quick release of clothes (plastron, jacket, trousers) in an emergency (e.g. to provide medical assistance).
- Integrated evacuation handles, enabling evacuation of the wounded with the use of a robot.
- Laser cut panels for the installation of additional equipment in a standard compatible with PALS/MOLLE system.
- The inside of the jacket made of 3D spacer mesh that improves air circulation, is resistant to sweat, and has antibacterial properties.
- The Suit is equipped with elements made of elastic fabric to improve User's mobility.
- The Suit is equipped with an integrated spine protection system against mechanical injuries.
- Adjustment/fitting of clothes (jackets) 2chem2mer by means of velcro connections (marked with colors) allowing to put on the clothes and adjusting 2chem to the size of the User intuitively.
- Unique front plastron design:
 - It is characterized by an innovative arrangement of ballistic inserts and the possibility of their mutual coaxial movement during use.
 - The design in the form of an autonomous vest allows to optimize the way weight is distributed on the user's body – reducing the effect of tilting forward.
 - The plastron is available in two variants: minimalist and standard (possibility of carrying side ballistic plates, wide side cummer band fastening straps, integral pocket for carrying the hydration system, etc.).
 - Equipped with an additional, quick-release modular panel with the PALS/MOLLE system allowing for simple, easy and quick replacement of the dedicated equipment.
- Thermal comfort, thanks to the use of an innovative vest equipped with an active cooling system.
- Ballistic helmet equipped with:
 - Visor
 - Voice communication system
 - Airflow that reduces the effect of fogging the visor
 - Additional steel visor cover.
- The design compatible both with a gas mask and a closed-type breathing apparatus.
- Compatible with chemical protection suit.
- The Suit and helmet equipped with a dedicated Management and Communication System, consisting of the following elements:
 - System of wired and wireless communication of the Operator with the Technical Support
 - Station.
 - High resolution camera, attached to the ballistic helmet of the clothes and an additional so-called mobile camera that allows the operator to visualize an object that is difficult to access. The system allows to send the image to the Technical Station,
 - LED lighting providing shadow-free illumination of the area in front of the Operator's helmet (lighting colors: neutral, blue, red, green).
 - Touch screen (on shoulder), allowing to i.a.: control the functions of the Suit (e.g. cooling, ventilation, lighting, etc.), display image from the Operator's own cameras, receive the image transmitted from the Technical Station (e.g. plans/diagrams of rooms/buildings, cargo database, etc.).
 - Technical Support Station, consisting of a high-performance computer for controlling all system functions, viewing images from the Operator's cameras and managing Suit systems (e.g. cooling, ventilation, lighting, communication, etc.).



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Ballistic resistance				
Suit Element	V50 (standard fragment with a mass of 1.1 g FSP.22) [m/s]		V50 (standard fragment with a mass of 2.84 g FSP.30) [m/s]	
	Basic ballistic inserts (soft)	Ballistic (composite) panels ²	Basic ballistic inserts (soft)	Ballistic (composite) panels ²
Value not less than [m/s]				
Jacket – front	600	N/A. ³	500	N/A. ³
Jacket – back				
Collar				
Jacket – shoulders				
Trousers – front				
Trousers – back				
Additional torso protection – front		1800		1300
Additional neck protection – collar		1200		900
Suspensor	N/A. ³	1200	N/A. ³	900
Additional thigh protection – front		900		800
Additional lower leg protection – front		900		800
Foot protection	Shin – front			800
	Shin – back	600		nd. ³
	Foot – top		500	800
Helmet	Shell	810		
	Visor	750	N/A. ³	N/A. ³
	Additional visor cover	1900		N/A. ³

The level of fragment protection was tested against STANAG 2920 by the Institute of Security Technologies "MORATEX"

² V50 parameter value for additional covers in combination with basic ballistic covers.

³ N/A. – not applicable.



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Explosion resistance:

Requirements and verification acc. to "Research methodology for the protection of human equipped with a sapper suit, against an explosion", author: Military Institute of Armored and Automotive Technology in Sulejów.

Research carried out with the use of the ATD Hybrid III 50th anthropomorphic testing device according to three different tests of the impact of the compression wave on humans:

- Test with ATD in a standing position with explosive detonation at ground level.
- Test with ATD in a standing position with explosive detonation 1.0 m above the ground level.
- Test with ATD in a kneeling position with explosive detonation at ground level.

Components:

- Jacket with protective collar
- Trousers
- Foot protectors
- Integrated Modular Ballistic Composite System (SKB):
 - Plastron - protection of the neck, torso, crotch and sides (a total of 5 plates)
 - User lower limbs protection plates (a total of 4 plates).
- Ballistic helmet with camera and lighting, equipped with a system that prevents the visor from fogging up
- Hearing protectors
- Additional mobile camera
- Additional steel cover protecting the helmet's visor
- Control Panel
- Expansion unit
- Communication module
- Additional equipment:
 - CBRN suit
 - Breathing apparatus (oxygen) and/or gas mask
 - Cooling vest
 - Thermo-active, anti-electrostatic, flame-retardant underwear
 - Flame retardant tactical gloves
 - Flame-retardant balaclavas.

Expansion unit features – Management and Communication System allows i.a. to:

- Control the Suit functions (lighting, communication, camera view, protection against fogging of the helmet and activation of the User's body cooling system) by both the User and the Technician.
- Depending on the given situation, establish wired and wireless communication between the User and the Technical Support Station.
- LED lighting (attached to the ballistic helmet).
- Touch screen (on shoulder).
- Technical Support Station (computer station).

The project is implemented as part of the Smart Growth Operational Program. Increasing the scientific and research potential. Scientific research and development works. Application projects.

Title of the project: "New generation explosion-proof and fragment-proof protective suit"

Project ID: POIR.04.01.04-00-0007/18

Consortium: Institute of Security Technologies "MORATEX" and LUBAWA Spółka Akcyjna
Technological partner: MindMade Sp. z o.o. (WB Group)

This product is the subject of the invention / utility model claim in the Patent Office of the Republic of Poland.

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