



r4-e

CROWD MANAGEMENT /  
CORRECTIONAL SUIT

# Product Summary

APRIL 2009

## For the **New Mawashi Suit**

MODEL R4-E

**CONSIDER THIS:** 13,000 officers deployed at the 2007 G8 Summit in Germany; 433 injured. How do you know if your gear is up to the task? If it has CSA Z617 Impact Protection then be confident it is. Stab/slash threats are real and serious. NIJ 0115 Stab Resistance assures protection.

**A NEW SOLUTION:** Until now you had to choose between a PPE that provided good protection and one that provided mobility, flexibility and kept the wearer cool. The New Mawashi Suit provides solid protection while being completely mobile, flexible and remains cool and comfortable. The suit is also fully compatible with the Mawashi 2-Part Coverall and other coveralls.

**LET US PROVE IT!** Officers who try the suit say "its so flexible it feels like you're not wearing anything". We welcome you to try it on and see how effective the combined technologies in the New Mawashi Suit really are.

[WWW.MAWASHI.NET](http://WWW.MAWASHI.NET) TEL.: +1 (450) 349-9833



**mawashi**

## // Industry Leading Solution

The R4-E Crowd Management / Correctional Suit delivers unprecedented **flexibility, cooling, and comfort** to law enforcement / corrections officers in conjunction with being the first blunt impact protection PPE that meets the **impact attenuation** criteria of the recently released performance standard **CAN/CSA Z617-06** Personal Protective Equipment (PPE) for Blunt Trauma. This exceptional combination of protection and function makes the R4-E Suit the industry leading solution for law enforcement / corrections officers directly involved with crowd management, civil disturbances, cell extractions, riot control, violent inmate disturbances, and other emergency response operations.

The Mawashi R4-E Suit is comprised of an easy and fast to don and doff upper assembly (covering from the neck to the wrists and waist) and lower assembly (covering from the waist to the upper feet) that incorporates key elements that include:

- Front and back hard-armour plates that meet the **stab/spike resistance** requirements of NIJ Standard 0115.00 Stab Resistance of Personal Body Armor – Spike Level 1. It is important to note that these plates are worn over existing stab vests and will increase the overall stab protection for officers.
- A highly effective mesh-ventilation layer throughout the arm and leg regions to help with **cooling** the wearer and **reduce heat stress affects** that may arise due to wearing blunt impact protection PPE.
- Full **range-of-motion** and complete **ease-of-motion** for the wearer due to the extremely ergonomic design of the shoulder, elbow, mid-section, and knee regions of the R4-E Suit and its overall ergonomic integration and design.
- Optimal **sizing & fit**, a high level of **standby comfort**, an **emergency suit removal** feature, a degree of **liquid penetration resistance**, complete compatibility with current equipment & tactics, integrated **lumbar support**, optional **flame resistance materials**, and an optional **bloodborne pathogen resistant coverall** or flame resistant coverall.



## // Industry Leading Company

Mawashi Protective Clothing, Inc. is a leading developer and manufacturer of personal protective equipment for law enforcement, correctional service, and military users and the challenging environments they work in.

By employing over 10 years of direct experience with **human factors & ergonomics, protective technologies, and cooling systems** and relying on extensive research, development, and design knowledge Mawashi has created revolutionary new solutions and made significant enhancements to existing products for law enforcement, corrections, and military personnel.

### 1 // Impact Attenuation

The first and most critical aspect of the Mawashi R4-E Suit is that it offers an unparalleled high level of impact attenuation as per the test methods and criteria set out in the **standard CAN/CSA Z617-06 Personal Protective Equipment (PPE) for Blunt Trauma** and it has been validated by a qualified independent third party (Biokinetics and Associates Ltd., Ottawa, Ontario).

The major benefit and advantage of a blunt impact PPE system meeting the impact attenuation set out in the CSA Z617 standard is that the system is qualified via test methods and criteria that have been established by a professional and recognized technical committee consisting of corrections officers, law enforcement officers, industry participants, laboratory specialists, technical experts, and related individuals and organizations involved with blunt impact PPE who are experts and specialists in this field. The CSA Z617 technical committee has undertaken a formal process to investigate, evaluate, and quantify blunt impact threats and then to research and develop test methods and criteria to determine compliance of given systems with respect to essential impact protection for users.

With a blunt impact PPE system that meets CAN/CSA Z617-06 impact attenuation criteria corrections officers can have confidence that the suit they are depending on has been independently validated and meets criteria which have been deemed essential by the above mentioned technical committee of experts and specialists. A system compliant with CAN/CSA Z617-06 impact attenuation can be considered the **minimal effective protection for a majority of law enforcement and correctional service operations.**



**THREAT SUMMARY:**

Specifically the energy levels associated with the threats of concern (including: hand-held round or hand-held edged (non-blade) weapons or improvised weapons; personal assaults via punches, thrusts, and kicks; and falling on or being struck with various flat or edged (non-blade) items or surfaces) were analyzed and characterized by the CSA Z716 technical committee and are summarized in the below table.

Threat Category	Energy (J)
Hand-Held Round (Pipe) Weapon	275
Hand-Held Edge (Non-Blade) Weapon	276
Personal Assault (Punch, Thrust, or Kick) (Approximately Spherical)	275
Struck – Flat (Item or Surface)	240
Struck – Edge (Item or Surface)	240

*The information in this table is an excerpt from Table B.4  
CAN/CSA Z617-06.*

**PERFORMANCE SUMMARY:**

When comparing the energy levels indicated in the “Threat Summary” table on this page and the “Performance Summary” table on the following page it is quite clear that the required CAN/CSA Z617-06 impact attenuation is associated with threat energy levels that can be considered **appreciably below the real world threat energies** characterized by the CSA Z617 technical committee. During the development of a PPE performance standard this may occur with the understanding that PPE systems generally involve a balance between protection and function; and some compromises must be made in protection in order to permit sufficient function for the wearer.

By meeting the indicated performance criteria law enforcement / corrections officers will have what can be considered minimal protection for their regular operations. Therefore it is the opinion of Mawashi Protective Clothing Inc. that law enforcement / corrections blunt impact protection **suits that do not meet CAN/CSA Z617-06 impact attenuation** levels can be considered **well below the minimal acceptable protection necessary for officers.**



The Mawashi R4-E Suit provides extensive coverage for the body regions and protection levels set out by CAN/CSA Z617-06 (see below table) and it is our opinion and understanding that no other PPE suits currently meet these requirements:

Body Region	Impact Threat	Threat Energy (J)	Performance
Lower Leg	Edge Impact	20	< 3 kN
Lower Leg	Sphere Impact	20	< 3 kN
Knee	Edge Impact	20	< 3 kN
Upper Leg (Thigh)	Edge Impact	20	< 3 kN
Hip/Pelvis	Edge Impact	20	< 3 kN
Groin	Sphere Impact	75	< 25 mm
Abdomen	Edge Impact	75	< 50 mm
Abdomen	Sphere Impact	75	< 50 mm
Chest	Edge Impact	75	< 50 mm
Chest	Sphere Impact	75	< 50 mm
Shoulder	Edge Impact	15	< 3 kN
Upper Arm	Edge Impact	15	< 3 kN
Elbow	Edge Impact	15	< 3 kN
Forearm	Edge Impact	15	< 3 kN
Spine (Thoracic)	Edge Impact	75	< 2 kN
Spine (Thoracic)	Sphere Impact	75	< 2 kN



## 2 // Flexibility & Mobility

The second and very important aspect of the Mawashi R4-E is that it offers a very high level of flexibility & mobility for a system that offers such a level of impact attenuation. The suit offers users a **full range-of-motion (i.e. flexibility)** and **complete ease-of-motion (i.e. mobility)** while maintaining the necessary impact protection and coverage areas and other important aspects (e.g. cooling, stab protection, etc.) of the R4-E.



Through Mawashi's expertise with researching, understanding, and applying knowledge of human factors & ergonomics we are able to deliver systems that do not impede or fatigue users while they are wearing PPE and the R4-E is an excellent example of the application of this knowledge resulting in a very comfortable and functional suit.

By providing this exceptional level of flexibility & mobility the users will have much greater comfort (and thus less distraction and irritation) and their functionality (ability to perform necessary roles, tasks, actions, etc.) will not be impeded. In this way officers benefit from all the protection of CAN/CSA 617-06 impact attenuation levels and coverage areas but they are not adversely affected by this protection.

### 3 // Cooling & Heat Stress Reduction

The Mawashi R4-E Suit incorporates a **"secure off-set" design** approach for the protective plates and components over the torso so that ventilation channels and spacers are present underneath the suit. With the "off-set" aspect of this design approach cooling air flow and ventilation is achieved and with the "secure" aspect of the design the protective plates and components are retained in the proper position and remain stable and do not shake or shift during dynamic activity and rapid response situations. This "secure off-set" approach is achieved by utilizing a **sub-harness system that creates air ventilation** and cooling channels for the wearer and positions and stabilizes the protective torso plates and components of the suit. Additionally the protective plates and components over the legs and arms regions have a **"ventilation mesh" integrated throughout the design that helps facilitate air flow** between the wearer's body and these protective elements of the suit.

By allowing for more air flow underneath the suit Mawashi is able to maximize on the body's natural cooling process of perspiration evaporation. With a "secure off-set" design approach and the use of "ventilation mesh" officers can be confident their suit will help cool them and reduce excess body heat which can contribute to heat-stress.



## 4 // Stab/Spike Protection

The Mawashi R4-E has a standard feature comprising **stab/spike protection front plates that cover from the groin up to the neck and a rear plate covering the lower to upper back region.** These plates are multi-threat protection rated since they offer stab/spike protection in conjunction with blunt impact protection. The level of stab/spike protection has been evaluated based on the test methodology in NIJ Standard 0115.00 Stab Resistance of Personal Body Armor for Threat Class Spike Level 1 by a qualified independent third party (Biokinetics and Associates Ltd., Ottawa, Ontario).

It is very important to note that the R4-E stab resistant plates will enhance and increase stab/spike protection for officers over and above the protection already present with their current stab resistant vest. Therefore officers wearing the R4-E will have a greater level of safety against stab threats and increased protection over vital areas of the body.



## 5 // Additional Features

The Mawashi R4-E Suit incorporates a range of additional features that greatly add to the wearer's overall flexibility, functionality, comfort, and protection. These additional features are summarized as follows.

### DONNING & DOFFING:

The R4-E can readily and easily be donned (i.e. put on and adjusted properly) and doffed (i.e. removed) **by a single officer on their own with a minimal number of steps and within a very short duration.** The duration required for donning & doffing the R4-E will decrease substantially as officers become experienced with the system over a short period of time. In many cases for trained and experienced officers donning can occur in less than 120 seconds and doffing can occur in 30 seconds.

### SIZING & FIT:

The Mawashi R4-E offers optimal sizing & fit for the wearer. This system is readily and easily adjustable to accommodate the specific body shape and size of many different law enforcement / corrections officers. In addition the R4-E has a unisex design which readily accommodates female officers and provides a comfortable design with a correct fit. It is **available in three standard sizes** (Size 1, Size 2, and Size 3) and each size addresses a very wide range of body shapes and sizes due to the highly ergonomic design and **simple/easy adjustments integrated within the suit.**



## STANDBY COMFORT:

During the frequent situation of down-time between high intensity events or in a hold/waiting status it is very advantageous for officers to be able to open up components of their blunt impact PPE to allow for increased ventilation and cooling and very importantly to be able to rapidly close and reinstall the components to go into action. The R4-E is designed so that **the neck and chest plates can easily be opened on one side to permit for increased ventilation and cooling** (over and above that present with the integrated cooling aspects mentioned previously) and then to be very easily and quickly be closed to bring the suit back to full coverage and protection capacity.

## EMERGENCY SUIT REMOVAL:

The Mawashi R4-E allows for emergency removal of the system from an injured officer. The straps and fasteners of the system can easily be cut away, with a standard utility type knife, by other officers or attending medical personnel which will very quickly free the officer from their suit if needed.

## LIQUID PENETRATION RESISTANCE:

The R4-E Suit incorporates textile materials that are produced in a special manner which makes them resistant to the ingress of water, liquids, and other substances. These textile materials protect the underlying impact attenuation materials and these textile materials also aid in cleaning and decontamination when such procedures are required.

## COMPATIBILITY:

The R4-E can readily and easily be worn underneath the Mawashi Bloodborne Pathogen Resistant Coverall, Mawashi flame resistant coverall, and underneath standard types coveralls and be worn over standard uniforms and/or flame resistant full-length underwear. In addition **the suit fully accommodates the wearing and use of other law enforcement / corrections officers' apparel and equipment** (e.g. stab protection soft armour vest, duty belt, hand-cuffs, etc.).

## LUMBAR SUPPORT:

The R4-E has a 3-part wrap-around lumbar support (covering from the lower back to the sides/hips) to help officers feel more comfortable and less fatigued after wearing the suit for extended periods of time.



**SUIT MATERIALS:**

The Mawashi R4-E is comprised of an outer covering that is a **durable Nylon woven fabric** which protects the underlying impact protection materials and keeps them in proper position. The impact reduction materials include **impact dampening specialty polymer foams and rigid or semi-rigid polymer / plastic plates**. These materials are assembled in a proprietary manner which delivers optimal impact protection while supporting the important human factors & ergonomics aspects of the system. For the region from the groin to neck and for the back there are stab/spike protection plates that are made of **high-performance molded composite** materials that resist spike penetration and also provide a very high level of blunt impact protection. The impact and stab protection materials are assembled within the tough outer covering and a robust inner lining. The inner lining is a durable Nylon woven fabric and it protects the overlying impact protection materials and keeps them in proper position within the system. For the legs and arms regions there is a **durable Polyester/Nylon ventilation mesh** integrated into the design to permit increased air flow in these areas.

**FLAME RESISTANCE (OPTIONAL):**

Upon specific customer request the materials used in the R4-E Suit can be modified to meet specified flame resistance test methods and criteria.

**BLOODBORNE PATHOGEN COVERALL (OPTIONAL):**

The Bloodborne Pathogen Resistant Coverall is comprised of a **two piece design (jacket & pants)** that readily fits over the R4-E Suit in a similar manner to the Flame Resistant Coverall. The Bloodborne Pathogen Resistant Coverall provides the wearer with protection against contact with bloodborne pathogens, bodily fluids, and other potentially hazardous liquids and materials.

This coverall is constructed with a **special pathogen resistant material (Gore Crosstech)** that is also **highly flame resistant and very durable**. The Bloodborne Pathogen Resistant Coverall design permits full ergonomics, functionality, and equipment compatibility for law enforcement / corrections officers. In addition it has an **integrated low-profile handle** on the upper rear torso that allows extraction or dragging of an officer in the event of an injury or emergency; where this handle is designed so that it can be readily and easily accessed when needed.





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#### FLAME RESISTANT COVERALL (OPTIONAL):

The Flame Resistant Coverall is comprised of a **two piece design (jacket & pants)** that readily fits over the R4-E Suit in a similar manner to the Bloodborne Pathogen Resistant Coverall. The Flame Resistant Coverall provides the wearer with protection against flame and heat from burning materials in close proximity to the wearer and/or small amounts of burning substances on the coverall itself.

This coverall is constructed with a **special flame resistant material (Dupont Nomex) that is also very durable.** The Flame Resistant Coverall design permits full ergonomics, functionality, and equipment compatibility for law enforcement / corrections officers. In addition it has an **integrated low-profile handle** on the upper rear torso that allows for extraction or dragging of an officer in the event of an injury or emergency; where this handle is designed so that it can be readily and easily accessed when needed.

Depending on operational requirements Mawashi recommends officers to wear either the Bloodborne Pathogen Resistant Coverall or Flame Resistant Coverall over top of their R4-E Suit for maximum protection and full functionality, comfort, and flexibility.

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