This MotoCAP safety rating applies to:

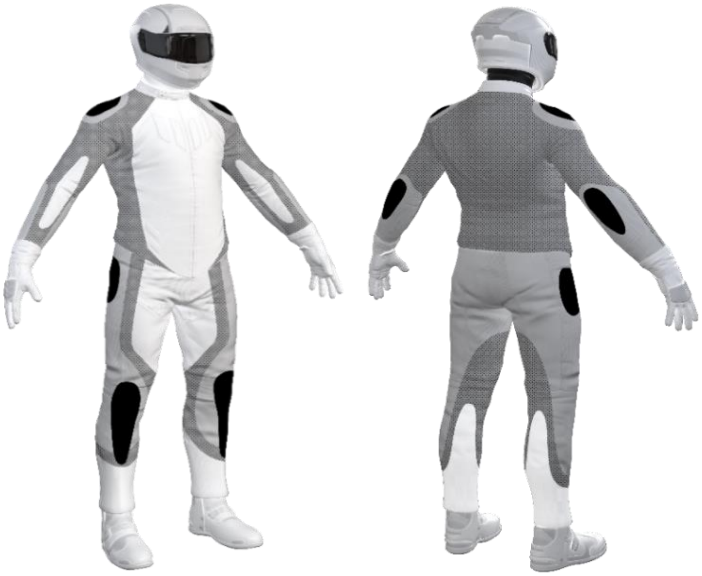
Brand	Macna
Model	Empire
Type	Textile Jacket
Date purchased	13 March 2024
Sizes tested	L and XL
Test garment gender	Male
Style	All Purpose
RRP	$299.95

Test Results Summary	Rating	Score
MotoCAP Protection Rating	★	26.9
Abrasion	1/10	0.62
Burst	7/10	763
Impact	7/10	53.9
MotoCAP Breathability Rating	★	0.275
Moisture Vapour Resistance	-	74.4
Thermal Resistance	-	0.342
Water resistance	3/10	18.6

This garment is fitted with impact protectors for the elbows and shoulders. A pocket is provided for an aftermarket back protector. Mesh panels are located in the arms, chest and back to allow airflow movement through the garment. This garment has a removable water-resistant liner. The breathability rating above was achieved with the water-resistant liner removed. When tested with the water-resistant liner installed, the breathability rating reduced to half a star.

Jacket and Pants - Crash Impact Risk Zones

This diagram is a pictorial representation of the crash impact risk Zones.



Removable liners

Thermal liner	
Water resistant liner	✓

Removable impact protection

	Pockets	Armour
Elbow	✓	✓
Shoulder	✓	✓
Back	✓	

Zone 1	Zone 2	Zone 3	Zone 4
High risk of abrasion High risk of impact	High risk of abrasion	Medium risk of abrasion	Low risk of abrasion

Abrasion Resistance

The jacket was tested for abrasion resistance in accordance with MotoCAP test protocols. The diagram below is a visual indication of the likely abrasion performance of the materials in each zone calculated from the data in the table below. The colour coding is based on the worst performing material in each zone.

Abrasion Resistance Performance	
Abrasion rating	1/10
Abrasion score	0.62

Determining Criteria	Area	Good	Acceptable	Marginal	Poor
High abrasion risk	Zone 1 & 2	> 5.6	3.0 - 5.6	1.3 - 2.9	< 1.3
Medium abrasion risk	Zone 3	> 2.5	1.8 - 2.5	0.8 - 1.7	< 0.8
Low abrasion risk	Zone 4	>1.5	1.0 - 1.5	0.4 - 0.9	< 0.4

Individual Abrasion Resistance Results: - The table below shows the test results for time to abrade through all layers of the materials. Calculated for each sample by Zone, type and area coverage of each material as a proportion of that Zone. Abrasion times are capped at a maximum of 10.00s.

Abrasion time for each test (seconds)

Zone 1 & 2	Coverage (%)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Average	
Material A	60%	2.94	4.11		3.14	3.54	7.79	4.30	A
Material B	40%	0.91	0.52	0.89	0.81	0.50	1.10	0.79	P
Zone 3	Coverage (%)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	**Average**	
Material C	80%	0.56	0.55	0.47	0.45	0.65	0.48	0.53	P
Material B	20%	0.91	0.52	0.89	0.81	0.50	1.10	0.79	P
Zone 4	Coverage (%)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	**Average**	
Material C	70%	0.56	0.55	0.47	0.45	0.65	0.48	0.53	M
Material B	30%	0.91	0.52	0.89	0.81	0.50	1.10	0.79	M

Details of materials used in jacket

Material A	Woven fabric shell, foam layer and mesh inner liner
Material B	Woven fabric shell and mesh inner liner
Material C	Mesh fabric shell with mesh inner liner

Burst Strength

The jacket was tested for burst strength in accordance with MotoCAP test protocols. The diagram below illustrates the burst strength results in terms of the likely performance of the garment in an impact and is a pictorial representation of the data from the table below.

Burst Strength Performance	
Burst rating	7/10
Burst score	763

Determining Criteria	Unit	Good	Acceptable	Marginal	Poor
Burst strength	(kPa)	> 1000	800 - 1000	500 - 799	< 500

Individual Burst Strength Results: - The table below shows the burst pressure in kilopascals (kPA) for each sample tested by Zone and the average result for each zone.

Burst pressure for each seam (kPA)

Area	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Average	
Zones 1 & 2	383	1004	457	1031	818	1000	782	M
Zones 3 & 4	1190	570	611	766	609	380	688	M

Impact Protection

The jacket was tested for impact protection and coverage in accordance with MotoCAP test protocols. The diagram below is a visual indication of the likely performance of each impact protector calculated from the data in the table below. The colour coding is based on the worst performing score for average or maximum force for each impact zone. Areas shaded black are not considered for impact protection ratings.

Impact Protection Performance	
Impact rating	7/10
Impact score	53.9

Determining Criteria	Unit	Good	Acceptable	Marginal	Poor*
Impact force	(kN)	< 15	15 - 24	25 - 30	> 30

* Poor may also indicate that no impact protector, or impact protector pocket is present in the garment

Individual Impact Protector Results: - The table below shows the test results for each strike on each impact protector in kilonewtons (kN) and their area of coverage as a proportion (%) of the Zone. Individual strike results are capped at a maximum of 50kN.

Impact protector type	Elbow		Shoulder	
Average force (kN)	21.4	A	21.8	A
Maximum force (kN)	23.7	A	24.9	A
Coverage of Zone 1 area	150%		130%	
Coverage of Zone after displacement	100%		100%	

Individual Impact Protector Results: - The table below shows the test results for each strike on individual impact protectors in kilonewtons (kN) and the position of the strike. Individual strike results are capped at a maximum of 50kN.

Force transfer for each impact strike (kN)

Impact protector type	Elbow			Shoulder		
Strike location	Centre	Mid	Edge	Centre	Mid	Edge
Impact Protector 1	20.6	20.6	23.6	19.0	21.0	23.2
Impact Protector 2	19.5	21.2	23.7	19.7	20.9	24.3
Impact Protector 3	20.3	20.8	22.2	21.0	22.5	24.9

Breathability

The jacket was tested for breathability following the MotoCAP test protocols. The table below shows the moisture vapour resistance and the thermal resistance values obtained.

Without removable liners		With water-resistant liner	
Breathability rating	★	Breathability rating	★
Breathability score	0.275	Breathability score	0.122

Moisture Vapour Resistance - R_{et} (kPa.m^2/W)	1	2	Average
Without removable liners	78.3	70.5	74.4
With water-resistant liner	167.7	158.6	163.2

Thermal Resistance - R_{ct} (K.m^2/W)	1	2	Average
Without removable liners	0.337	0.346	0.342
With water-resistant liner	0.313	0.349	0.331

Water spray and rain resistance

This jacket is advertised as water-resistant, and so has been tested for water spray and rain resistance according to the MotoCAP test protocols. The table below shows the water absorbed (ml) and the wetting proportion (%) of the garment and undergarments due to water absorption.

	Water absorbed by garment		Water absorbed by underwear	
	Volume (ml)	Percentage (%)	Volume (ml)	Percentage (%)
Jacket 1	343	25%	57	19%
Jacket 2	501	37%	53	18%
Average	422	31%	55	19%

Location of wetting

There was minor wetting to the cotton underwear present at the cuffs of the sleeves and neck for both jackets tested.

Assessment Details.

Brand	Macna
Model	Empire
Type	Textile Jacket
Date purchased	13 March 2024
Tested by	AMCAF, Deakin University
Report approved by	MotoCAP Chief Scientist
Garment test reference	J24T30
Rating first published	June 2024
Rating updated	1 November 2024