This MotoCAP safety rating applies to:

Brand:	Macna
Model:	Fulcrum
Type:	Pants - Textile
Date purchased:	29 November 2018
Sizes tested:	L
Gender:	M
Style:	Tourer
Test code:	P18T08

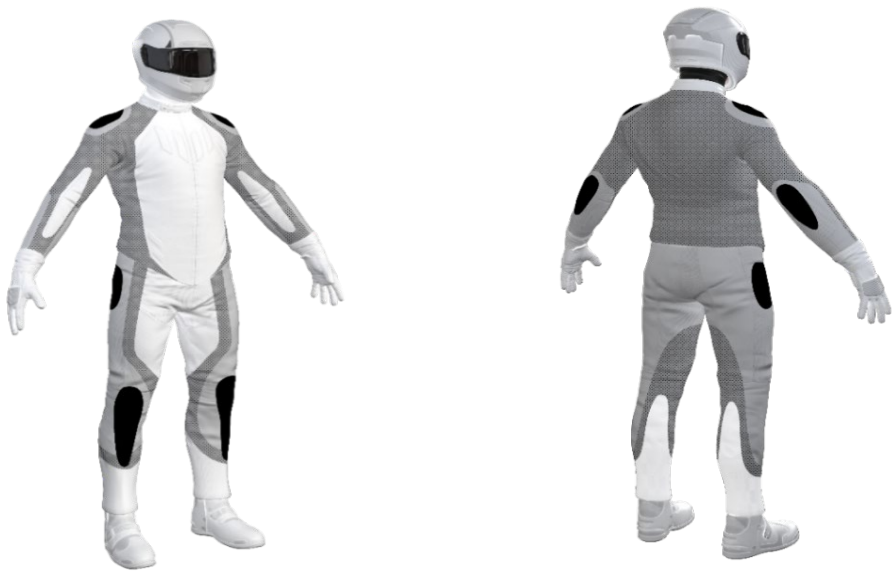
Test Results Summary:

	Rating	Score
MotoCAP Protection Rating	★	1.6
Abrasion	1/10	-1.37
Burst	8/10	842
Impact	1/10	0.0
MotoCAP Comfort Rating	★	0.227
Moisture Vapour Resistance		61.1
Thermal Resistance		0.231
Water resistance	8/10	3.0

This garment is fitted with impact protectors for the knees and with pockets for aftermarket impact protectors for the hips. This garment has closable mesh vents above the knee and inside lower leg to aid cooling in hot weather. The thermal comfort measurements undertaken have not evaluated the performance of venting provided in this garment. The thermal comfort of this product may be better when the vents can be opened.

Jacket and Pants - Crash Impact Risk Zones

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



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 garment was tested for abrasion resistance in accordance with MotoCAP test protocols. 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.

Details of materials used in garment:

Material A:	Woven nylon shell, wadding layer, fabric liner, mesh liner, foam layer and mesh liner
Material B:	Woven nylon textile shell and mesh inner liner
Material C:	Stretchy synthetic outer and mesh inner liner

Zone	Coverage (%)	Abrasion time for each test (seconds) 1	2	3	4	5	6	Average (seconds)	
Zone 1 and 2 areas (High abrasion risk)									
Material A	50%	10.00	10.00	10.00	10.00	10.00	10.00	10.00	G
Material B	50%	0.87	0.62	0.62	0.49	0.45	0.58	0.61	P
Zone 3 area (Medium abrasion risk)									
Material B	100%	0.87	0.62	0.62	0.49	0.45	0.58	0.61	P
Zone 4 area (Low abrasion risk)									
Material B	20%	0.87	0.62	0.62	0.49	0.45	0.58	0.61	M
Material C	80%	0.52	0.39	0.69	0.56			0.54	M

Abrasion times are capped at a maximum of 10.00s.

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 above. The colour coding is based on the worst performing material in each zone.

Determining Criteria		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

Burst Strength

The garment's burst strength was tested in accordance with MotoCAP test protocols. 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 (kPA)

Area	1	2	3	4	5	Average	
Zones 1 & 2	1029	874	975	1091	478	889	A
Zone EZ	1162	1380	883	645	448	904	A
Zones 3 & 4	648	672	800	733	261	623	M

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 above.

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

Impact Protection

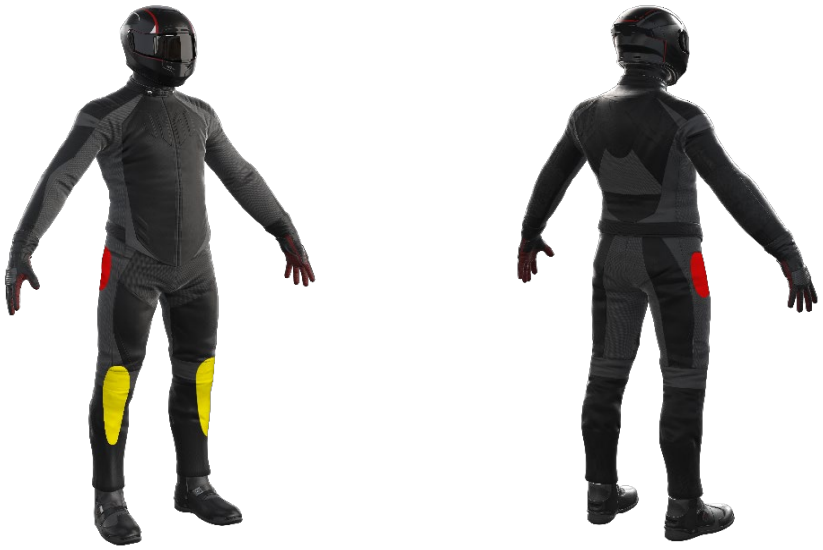
The garment was tested for impact protection and coverage in accordance with MotoCAP test protocols. The table below shows the test results for each strike on each impact protector in kilonewton (kN) and their area of coverage as a proportion (%) of the Zone.

Impact protector type	Knee		Hip	
Average force (kN)	17.9	A		P
Maximum force (kN)	23.1	A		P
Coverage of zone 1 area	140%		0%	
Coverage of zone after displacement	40%		0%	

Individual test results

Impact force (kN)	Knee			Hip	No impact protector present	
Strike location	**A**	**B**	**C**	**A**	**B**	**C**
Impact Protector 1	13.9	16.6	22.5			
Impact Protector 2	14.1	16.4	22.9			
Impact Protector 3	14.8	16.6	23.1			

The diagram below is a visual indication of the likely performance of each impact protector calculated from the data in the table above. The colour coding is based on the worst performing score for average or maximium force for each impact zone.



Determining Criteria		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

Areas shaded black are not considered in the impact protection ratings.

Thermal comfort

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

	1	2	**Average**
Moisture Vapour Resistance - R_{et} ($kPam^2/W$)	64.3	58.0	61.1

	1	2	**Average**
Thermal Resistance - R_{ct} (Km^2/W)	0.234	0.229	0.231

Water spray and rain resistance

This garment 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 increased weight (ml) and proportion (%) of the garment and undergarments due to water absorption.

	Water absorbed by garment		Water absorbed by underwear	
	Volume (ml)	Percentage (%)	Volume (ml)	Percentage (%)
Pants 1	263	20%	11	4%
Pants 2	683	52%	5	2%
Average	473	36%	8	3%

Location of wetting:

There was no visible wetting to the cotton undergarment worn under the motorcycle water resistant pants.