This MotoCAP safety rating applies to:

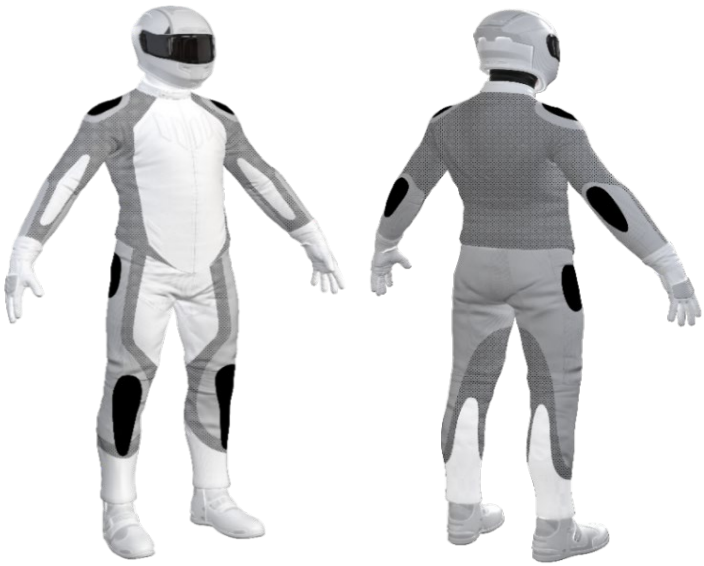
Brand	BMW
Model	Waterproof Herren
Type	Pants - Denim
Date purchased	4 December 2020
Sizes tested	30 and 34
Test garment gender	Male
Style	All Purpose
RRP	$499.00

Test Results Summary	Rating	Score
MotoCAP Protection Rating	★	27.1
Abrasion	1/10	0.91
Burst	9/10	931
Impact	6/10	44.1
MotoCAP Breathability Rating	★★	0.394
Moisture Vapour Resistance	-	29.2
Thermal Resistance	-	0.192
Water resistance	6/10	8.4

This garment is fitted with impact protectors for the knees and hips. There are no vents to allow airflow movement through the garment.

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	☐

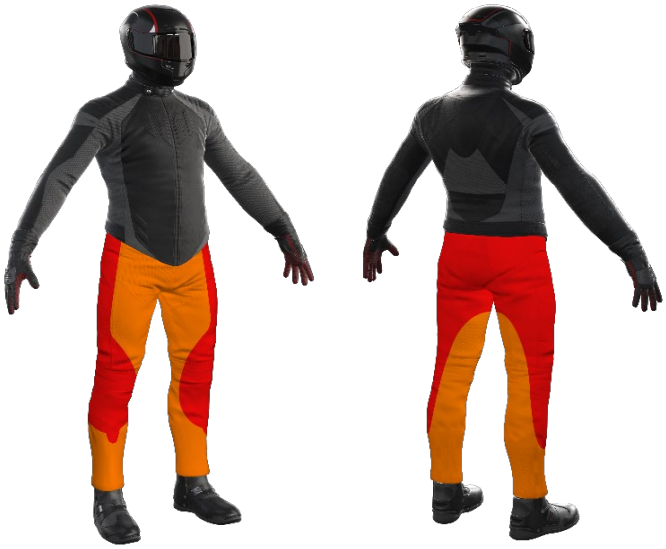
Removable impact protection

	Pockets	Armour
Knee	✓	✓
Hip	✓	✓

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

These pants were 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	0.91

Determining Criteria	Area	Good	Acceptable	Marginal	Poor
High abrasion risk	Zones 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)

Zones 1 & 2	Coverage (%)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Average	
Material A	100%	1.01	0.94	0.89	1.01	0.91	0.70	0.91	P

Zone 3	Coverage (%)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Average	
Material A	100%	1.01	0.94	0.89	1.01	0.91	0.70	0.91	M

Zone 4	Coverage (%)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Average	
Material A	100%	1.01	0.94	0.89	1.01	0.91	0.70	0.91	M

Details of materials used in jacket

Material A	Denim fabric shell with laminated water resistant layer and mesh inner liner

Burst Strength

These pants were 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	9/10
Burst score	931

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	430	899	862	976	979	1331	913	A
Zones 3 & 4	1173	991	1000	953	979	915	1002	G

Impact Protection

These pants were 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 maximium force for each impact zone. Areas shaded black are not considered for impact protection ratings.

Impact Protection Performance	
Impact rating	6/10
Impact score	44.1

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

Impact Protector Results: - The table below shows the average and maximum force transmitted through each impact protector type in kilonewtons (kN) and their area of coverage as a proportion (%) of the Zone.

Impact protector type	Knee		Hip	
Average force (kN)	15.7	A	15.9	A
Maximum force (kN)	24.8	A	21.3	A
Coverage of Zone 1 area	110%		105%	
Coverage of Zone after displacement	70%		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	Knee			Hip		
Strike location	Centre	Mid	Edge	Centre	Mid	Edge
Impact Protector 1	13.5	15.4	17.0	13.0	16.2	21.3
Impact Protector 2	15.4	12.7	24.8	14.2	15.0	17.0
Impact Protector 3	14.7	13.9	14.1	14.4	15.6	16.3

Breathability

These pants were 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	
Breathability rating	★★
Breathability score	0.394

With water-resistant liner	
Breathability rating	N/A
Breathability score	N/A

Moisture Vapour Resistance - R_{et} ($kPa.m^2/W$)	1	2	**Average**
Without removable liners	28.2	30.3	29.2
With water-resistant liner	N/A	N/A	N/A

Thermal Resistance - R_{ct} ($K.m^2/W$)	1	2	**Average**
Without removable liners	0.189	0.195	0.192
With water-resistant liner	N/A	N/A	N/A

Water spray and rain resistance

This pants are 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 (%)
Pants 1	79	9%	5	2%
Pants 2	83	9%	36	15%
Average	81	9%	20	8%

Location of wetting

Minor wetting to the cotton underwear was present at the waistband for one pair of pants and no visible wetting on the other pair of pants tested.

Assessment Details.

Brand	BMW
Model	Waterproof Herren
Type	Pants - Denim
Date purchased	4 December 2020
Tested by	AMCAF, Deakin University
Garment test reference	P20D03
Rating first published	March 2021
Rating updated	4 March 2021