Product Evaluation Report

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1.
Introduction

This report is a study into the effectiveness and operation of a new product scientifically designed and developed for the motorcycling market. The product branded as **Ventz®** is a Worldwide Patented and European design registered air flow/venting system. Ventz® is designed to reduce the excessive build up of latent heat under the protective clothing worn by most motorcyclists. In warmer conditions this heat can build up to very uncomfortable levels and can ultimately lead to a severe loss of rider concentration. Ventz® have been scientifically developed to greatly reduce this uncomfortable side effect of warm weather riding, leaving the rider free to concentrate on the road ahead and allowing them to arrive at their destination feeling cool and refreshed.

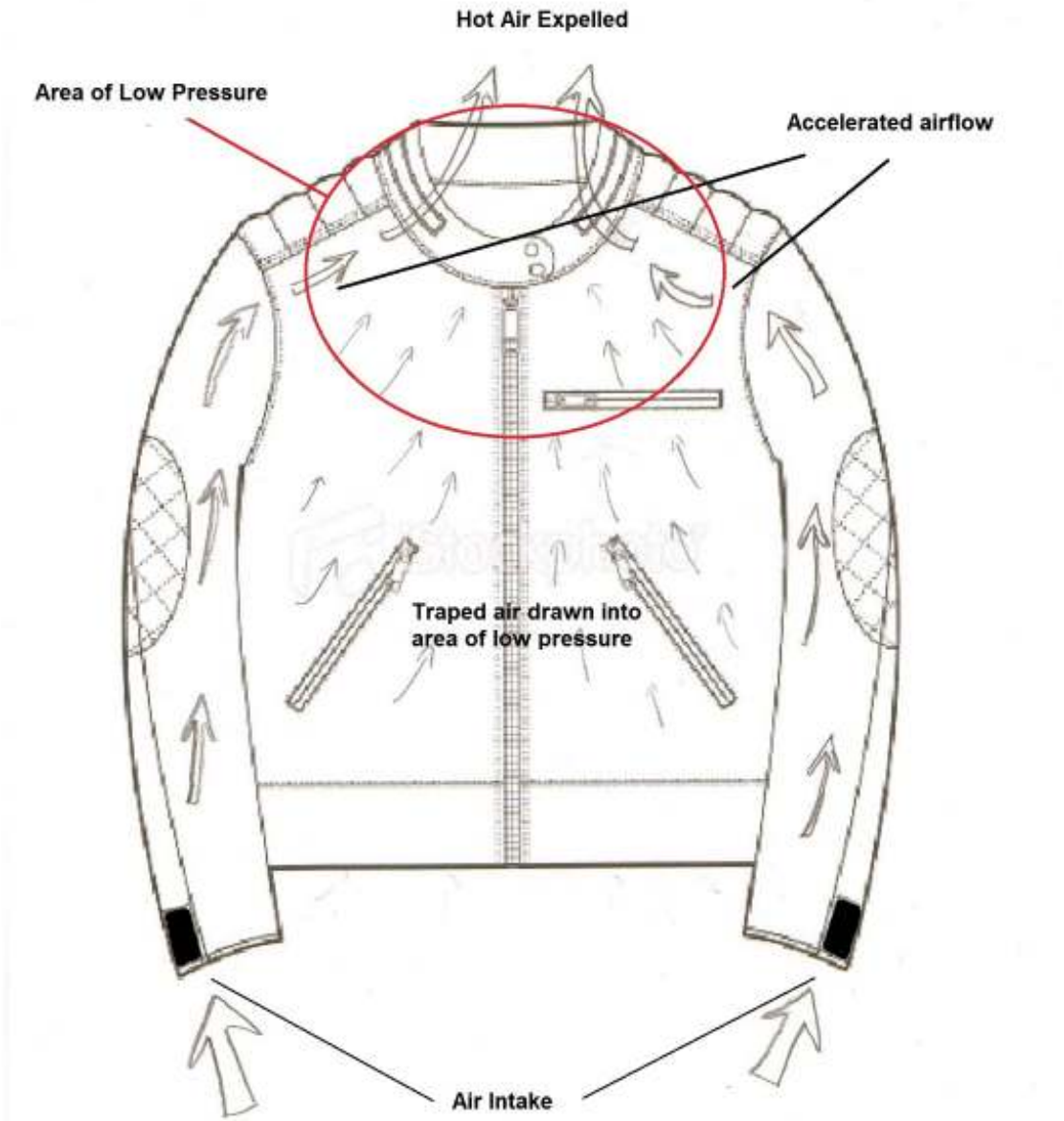
2.
Product Description

Fig 1.

i. **Ventz®** is a self contained air intake module (fig 1.) inserted into the user's jacket cuff (fig 2.). It has a flexible clip atop of the device to secure it in position whilst also allowing it to accommodate larger variations of material thickness. Ventz® are supplied as a pair for maximum effect.

ii. **Ventz®** have been designed to accelerate airflow as it flows through the device, this is achieved by using a narrowing taper from front to rear of the device, this is described in detail in section 3 "Airflow Rates" later in this report.

Principle of Operation;



The insertion of Ventz into the sleeve opening of your jacket effectively turns the jacket into one large venturi system. An accelerated airflow is generated by the Ventz device which flows up the sleeve and around the upper body before finally exiting the jacket via the neck opening; this faster flowing air exploits a principle known as the Bernoulli Effect. Bernoulli's Principle states that an increase in the velocity (speed) of air decreases the air pressure; lower air pressure creates a partial vacuum sucking in the adjacent air at normal pressure, in this instance the hotter air trapped around the lower regions of your body/jacket. The effect of this constant cycle of replenishing the air means that it is not possible for there to be any trapped air that can heat up to uncomfortable levels and any excessive body heat is immediately transferred out of the jacket keeping the user at a more comfortable riding temperature.

Ventz® in use:

Fig 2.

3.
Airflow Rates

Ventz® have been designed to accelerate the airflow speed of the incoming air, this has been achieved by designing the device to have differing surface areas between the receiving (front) end of the device and the exhaust (rear) end of the device.

Area of front inlet = 9.46cm2
Area of rear outlet = 5.51cm2

The acceleration volume of air entering the system is:

Volume flow rate (m^3 s-1) = Area (m^2) x Speed (ms-1)
Mass flow rate (kgs-1) = Area (m^2) x Density of Air (at atmospheric pressure, kg/m^3) x Speed (ms-1)

Source reference:

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Postgraduate Researcher, IdMRC
Department of Mechanical Engineering
University of Bath

Flow rate Chart:

Forward speed mph	Kph	cm/min	I/P flow qty cm3	Ltrs/min	outlet port cm2	exhaust speed mph
30	48	8000	75680	75.68	5.51	51.51
31	49.6	8266.667	78202.66667	78.20266667	5.51	53.22
32	51.2	8533.333	80725.33333	80.72533333	5.51	54.94
33	52.8	8800	83248	83.248	5.51	56.66
34	54.4	9066.667	85770.66667	85.77066667	5.51	58.37
35	56	9333.333	88293.33333	88.29333333	5.51	60.09
36	57.6	9600	90816	90.816	5.51	61.81
37	59.2	9866.667	93338.66667	93.33866667	5.51	63.52
38	60.8	10133.33	95861.33333	95.86133333	5.51	65.24
39	62.4	10400	98384	98.384	5.51	66.96
40	64	10666.67	100906.6667	100.9066667	5.51	68.68
45	72	12000	113520	113.52	5.51	77.26
50	80	13333.33	126133.3333	126.1333333	5.51	85.84
55	88	14666.67	138746.6667	138.7466667	5.51	94.43
60	96	16000	151360	151.36	5.51	103.01
65	104	17333.33	163973.3333	163.9733333	5.51	111.60
70	112	18666.67	176586.6667	176.5866667	5.51	120.18
75	120	20000	189200	189.2	5.51	128.77
80	128	21333.33	201813.3333	201.8133333	5.51	137.35

Chart 1.

Chart 1 Details the air volume and ultimately the resultant airflow velocity flowing from the Ventz® device – over a speed range from 30mph – 80mph. There is a direct correlation between the increase in speed and the pressure generated; it is the increased air velocity that forces the cooling air flow to continue up the riders sleeve into and around the wearer's upper body exiting around the neck area expelling the trapped heat from around the rider.

4.
Realtime Data

Realtime data has been recorded using the following equipment:

Multi Channel Temperature Chart Recorder Data Logger Monitoring 4 sensor Monitor DLH9097

Sensors	- Measures the temperature of your required objects. - Temperature range: -58 to 257F -50 to 125C - Cable length: 5 ft (1.5m). - Resolution: 0.1 °C - Probe Lengh: 1" (25mm) -Probe Diameter: 5mm

Fig 4.

Location of sensors:

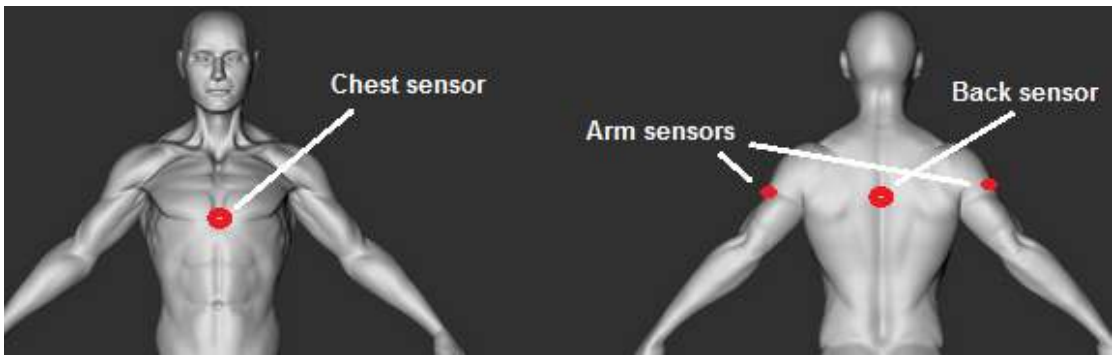

Fig 5.

The sensors were attached to the subject rider under his protective clothing in the locations indicated in fig 5; these locations offer the best positions for overall upper body temperature monitoring. Once installed the subject undertook a 25 minute motorcycle journey of which the first 15 minutes was without the use of Ventz® and the remaining 10 minutes of the journey with the use of Ventz®. The following graph shows the temperature data recorded for this journey.

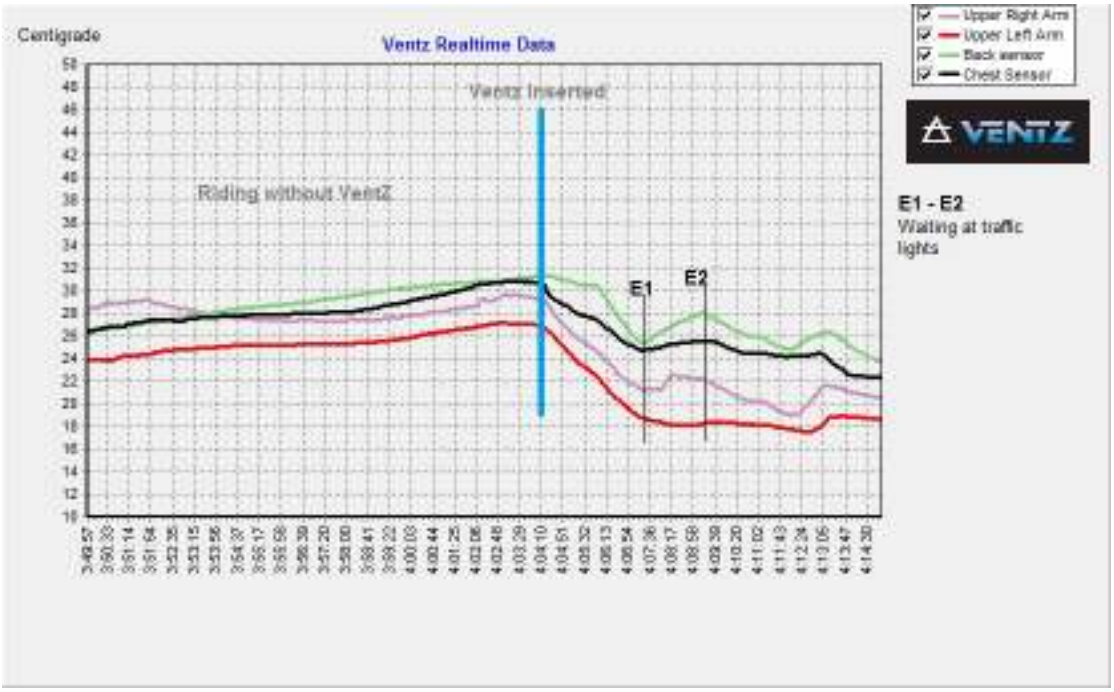

Chart 2

Studying chart 2 it can be clearly demonstrated that from the start of the journey at 3:49:57 the body temperature steadily increased up to the time when a pair of Ventz® were inserted at 4:04:10 - the temperature then immediately began to fall. This cyclical pattern was further evidenced by Event 1 (E1) when the temperature again started to rise. E1 was created when the rider had to stop at traffic lights for 2 minutes. Event 2 (E2) indicates the re-commencement of the journey and records the significant fall in body temperature. This clearly demonstrates the effectiveness of the Ventz® system and the almost instant cooling impact it has on the internal build-up of body heat

Below describes a detailed analysis of the data recorded on Chart 2

Without Ventz®

Average start temp @ 13:49 pm

21.875 Lowest
25.937 Highest

Av = (21.875 + 25.937) /2
= 23.906 deg C

Average temp before Ventz® insertion @ 14:04 pm over time period of 14 mins

27.062 Lowest
30.937 Highest

Av = (27.062 + 30.937) /2
= 29.00 deg C

Temp rise inside clothing without ventz®:

29.00 – 23.906 = 5.093 deg C

With Ventz®

Average temp at time of Ventz® insertion: 29.00 deg C

Average temp @ 14:14 pm over time period of 10 mins

18.687 Lowest
23.812 Highest

Av = (18.687 + 23.812) /2
= 21.249 deg C

Conclusions:

Effective average temperature drop following 10 mins of inserting ventz®:

Start temp:	29.00 deg C
Temp after 10 mins:	21.812 deg C
Temp drop:	29.00 – 21.812
	= **7.188 deg C**

Temperatures drop by percentage: [1-(21.249/29)] x 100 = **26.727%**

Summary
Following a ride of 14 mins without the use of Ventz® the average internal temperature of the riders clothing rose by 5.093 deg C to 29.00 deg C. Following the insertion of Ventz® after just 10 minutes usage the internal clothing temperature dropped by over **25%** to 21.812 deg C.