

Customer details: Treck SA
Santa Rosa # 5220
San Joaquin
Santiago
Chile

SATRA reference: FWT0244983 /1616 /2

Your reference: -

Date of report: 29th April 2016

Samples received: 26th May 2016

For the attention of: Andres Gandara Velasco

Date(s) work carried out: 20th – 26th April 2016

TECHNICAL REPORT

Subject: Two boots for cold rating test using SATRA TM 436:2010. described as VFlex V200 Boot & Absolute Zero 4065 Boot

Conditions of Issue:

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Please note uncertainty of measurement values have been taken into account when determining guideline values.

Report signed by: Charlotte Fowle
Position: Footwear Technologist
Department: Footwear Testing

SAMPLES SUBMITTED

Two boots were submitted with the following references;

- VFlex V200 Boot
- Absolute Zero 4065 Boot



Figure 1. Samples referenced as VFlex V200 Boot, left and Absolute Zero 4065 Boot, right

TESTS REQUESTED

SATRA TM 436 2010 *Determination of whole shoe thermal insulation and cold rating*

This test involves placing the conditioned footwear on an artificial foot which has heating coils at its centre. The temperature of the artificial foot is maintained at 38°C, the highest temperature likely to be attained by the skin of a human foot. The energy used to maintain this temperature is recorded and from this the heat loss from the artificial foot can be determined. The thermal resistance or 'R value' of the footwear can then be calculated by taking into account the surface area of the artificial foot plus the temperature difference between the artificial foot and the surrounding air during the test.

Using the R value and the desired temperature inside the footwear (SATRA considers 20°C as a comfortable temperature), it is possible to calculate the external temperatures at which heat loss rates of 4 Watts (for a very low level of activity), 8 Watts (for a low to medium level of activity) and 12 Watts (for a high level of activity) would be achieved. This is the SATRA Cold Rating; the three temperature values are the minimum temperatures at which the footwear will still feel comfortable at the different activity levels.

It should be noted that the insulation value 'R' is measured under standard conditions in our test. This will vary considerably if, for example, the upper and insulation materials become damp through the foot sweating or through external water absorption or water ingress. A standard lightweight hose is used in this test but the use of thicker, more insulating hose in wear may increase the thermal performance of the footwear. However, good fit is important as undue compression of any insulating layers or hose may reduce the thermal insulation performance by reducing the amount of trapped dry air.

TEST CONDITIONS

The samples were stored for at least 48 hours in a standard controlled environment of $23 \pm 2^\circ\text{C}/50 \pm 4\%\text{RH}$ prior to testing, which was carried out in the same conditioned atmosphere.

RESULTS AND COMMENTS

Sample reference	VFlex V200 Boot	Absolute Zero 4065 Boot
Marked boot size	42	42
Artificial foot size used	Size 9	Size 7
R value ($\text{m}^2 \text{ }^\circ\text{C/W}$)	0.2183	0.3736
Coldest temperature at very low activity levels (with a heat rate loss of 4W)	6.3	-6.4
Coldest temperature at low to medium activity levels (with a heat rate loss of 8W)	-7.5	-32.9
Coldest temperature at high activity levels (with a heat rate loss of 12W)	-21.2	-59.3

SATRA does not have any formal recommendations for this property but, based on provisional figures, we would consider the sample referenced as VFlex V200 boot to offer a medium level of insulation which is desirable for everyday boots and the sample referenced as Absolute Zero 4065 boot to offer a very high level of insulation which is recommended for extreme cold environments.

Note.

Despite both boots being marked as a size 42 the Absolute Zero 4065 had a thick bootie lining on the inside of the boot, which reduced the sizing of the footwear. Therefore this boot was tested on a small foot size than the VFlex, as the calculations are based around surface area of the foot we would not consider this to have influenced the results.

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Issue Date: 1st October 2009