

Textilní zkušební ústav, s.p.

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(Textile Testing Institute)

TESTING LABORATORY NO. 1001

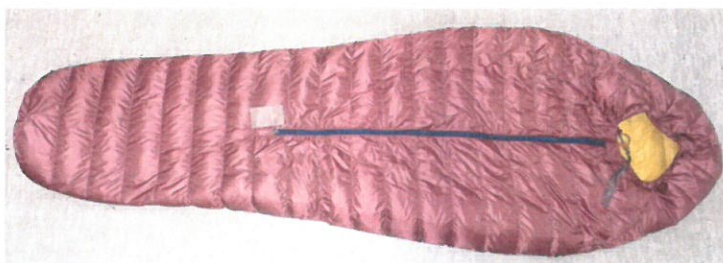
accredited according to EN ISO/IEC 17025:2005 by Czech institute for accreditation

TEST REPORT

AZL19/0068-01

CUSTOMER: TURBAT
Chaykovskogo 20
79000 Lvov
Ukraine

SAMPLE: Sleeping bag "KUK 250"
(according to the customer order)



SUBJECT OF ASSESSMENT: Thermal properties of sleeping bags; EN ISO 23537-1: 2016

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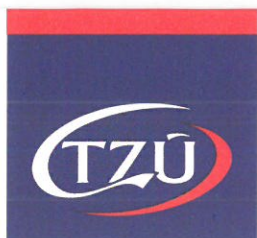
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PROCEDURE OF ASSESSMENT

Requirements for sleeping bags – Thermal properties of sleeping bags

Test method: EN ISO 23537-1:2016

Test conditions:

- Standard atmosphere for testing: relative humidity 50 -70%, temperature 10 °C
- Thermal manikin: KAREL
- Manikin body surface area: 1,85 m²
- Manikin body parameters: body height: 175 cm; body weight: 48 kg
- Manikin body surface temperature: 34 °C
- Position of manikin during testing: in lying position with attached head mask
- Air flow inside the climatic room: 0,1- 0,2 m.s⁻¹
- Number of tested specimens: 3x the same sample
- Artificial ground: manikin laying on rigid mattress (Rct = 0,85 m². K.W⁻¹)
- Manikin garment: two-piece suit (Rct = 0,051 m².K.W⁻¹); knee-length socks (Rct = 0,058 m².K.W⁻¹)

TEST RESULTS

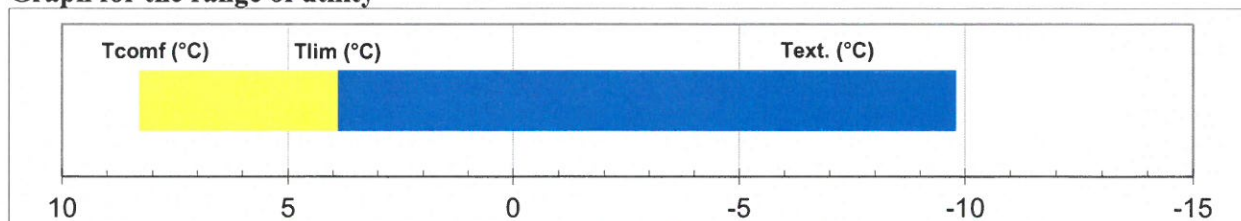
Sleeping bag “KUK 250”			
Characteristics	Test method	Measuring Unit	Values identified
Standard thermal insulation R_c (1)	EN ISO 23537-1:2016	m ² . K.W ⁻¹	0,774
- average value			
- coefficient of variation		%	0,2

Lower temperature limits of the range of utility:

Comfort temperature T _{comf} ⁽³⁾	Limit temperature T _{lim} ⁽²⁾	Extreme temperature T _{ext} ⁽¹⁾
8,3 °C	3,9 °C	-9,8 °C

- (1) extreme temperature - lower extreme temperature where the risk of health damage by hypothermia occurs
 (2) limit temperature - lower limit at which a sleeping bag user with a curled up body posture is globally in thermal equilibrium and just not feeling cold
 (3) comfort temperature - lower limit of the comfort range, down to which a sleeping bag user with a relaxed posture, such as lying on their back, is globally in thermal equilibrium and just not feeling cold

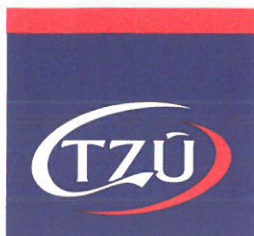
Graph for the range of utility



WARNING: In the risk range a strong sensation of cold has to be expected. There is a risk of health damage by hypothermia.

All values of uncertainty of measurement were calculated with assumption of normal distribution. For purposes of calculation of expanded uncertainty values will be multiplied by coverage factor k=2 for statistical level 95%. Sampling was not taken into consideration





Annex:

Warning of misuse of temperature rating

The insulation of a sleeping bag varies widely with the conditions of use (wind, radiating ambience, posture and clothing of the sleeping bag user, ground insulation, eventual humidity in the sleeping bag etc.), and perception of cold is also individually different (influence of acclimatisation, physical and psychological state, food etc.).

The limiting temperatures of the range of utility as determined in the EN ISO 23537-1: 2016 only compare performance of sleeping bags with regard to standardised test conditions. They do not take into account all possible variations in conditions of use and in individual reactions, and therefore should be considered only as a guideline, that needs personal adaptation for practical use.

In particular, it shall be noted that the extreme temperature is a very theoretical limit. It shall therefore only be considered as a point of danger that should not be approached - unless the sleeping bag user has a wide personal experience.

The determination of the comfort temperature uses the available knowledge of published data, based on the thermal balance of the whole body. The human body is very sensitive to local discomfort: a local thermal bridge may not influence the global insulation of the sleeping bag, but might greatly affect the sensation of cold of the sleeping bag user. It shall be emphasised that the test method in the EN ISO 23537-1: 2016 does not provide any guarantee against local cooling.

The temperatures of the range of utility relate to indoor conditions. For outdoor use, wind may affect insulation of the bag to a large extent, especially if the shell fabric of the sleeping bag is air permeable.

In the EN ISO 23537-1: 2016, sleeping bags are considered as dry. High moisture content might lower thermal performance.

Petr Nasadil
Head of Testing Laboratory

