

Textilní zkušební ústav

(Textile Testing Institute)  
Václavská 6, 65841 Brno, Česká republika

ACCREDITED TESTING LABORATORY No. 1001

# TEST REPORT

**FZZ 12 /0188**

**CUSTOMER :** Five Stars Ltd.  
3-a Biruzova Str.  
390039, Ryazan  
Russia

**SAMPLE :** sleeping bag  
(according to the customer order) **SHISHIGA** – designed for -15°C, Down Insulated, cocoon  
colour: grey/orange



**SUBJECT OF ASSESSMENT :** Thermal properties of sleeping bags according to EN 13537 annex A

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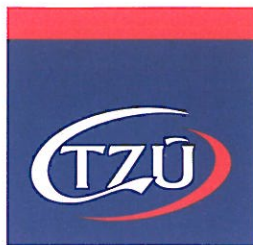
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## PROCEDURE OF ASSESSMENT

### Requirements for sleeping bags – Thermal properties of sleeping bags

**Test method:** EN 13537 Annex A

**Test conditions:** Standard atmosphere for testing: relative humidity 65 %  
temperature  $(20,0 \pm 0,5)^{\circ}\text{C}$

Thermal manikin: KAREL - 5 check points

Surface area:  $1,85 \text{ m}^2$

Manikin tall: 175 cm

Manikin weight: 48,- kg

Temperature check points:  $33^{\circ}\text{C}$

Position of manikin during measuring: in lying position

Air flow:  $\leq 0,35 \text{ m.s}^{-1}$

Number of specimens tested: 3x on the same sample after 24 hour

Artificial ground: rigid support with  $R_{ct} = 0,85 \text{ m}^2 \cdot \text{K} \cdot \text{W}^{-1}$

Dress: two-piece track - thermal insulation  $R_{ct} = 0,051 \text{ m}^2 \cdot \text{K} \cdot \text{W}^{-1}$

socks - thermal insulation  $R_{ct} = 0,058 \text{ m}^2 \cdot \text{K} \cdot \text{W}^{-1}$

Conditioning according to: relative humidity  $(65,0 \pm 4,0) \%$ , temperature  $(20,0 \pm 2,0)^{\circ}\text{C}$

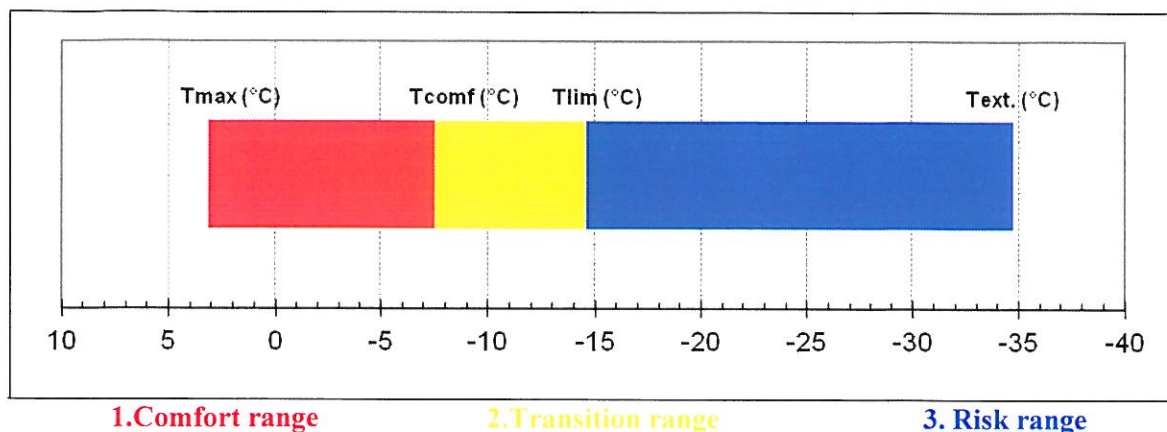
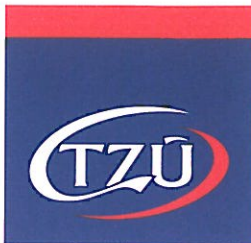
## TEST RESULTS

<b>sleeping bag</b> <b>SHISHIGA</b> – designed for $-15^{\circ}\text{C}$ , Down Insulated, cocoon colour: rey/orange			
Characteristics	Testing method	Measuring Unit	Values identified
<b>Standard thermal insulation <math>R_c</math></b> - average value - coefficient of variation	<b>EN 13537</b>	$\text{m}^2 \cdot \text{K} \cdot \text{W}^{-1}$ %	1,283 1,074

<b>Lower temperature limits of the range of utility</b>			
Maximum temperature $T_{\max}^{(4)}$	Comfort temperature $T_{\text{comf}}^{(3)}$	Limit temperature $T_{\text{lim}}^{(2)}$	Extreme temperature $T_{\text{ext}}^{(1)}$
$3,2^{\circ}\text{C}$	$-7,5^{\circ}\text{C}$	$-14,6^{\circ}\text{C}$	$-34,7^{\circ}\text{C}$

- (1) lower extreme temperature where the risk of health damage by hypothermia occurs (related to a standard woman in standard conditions of use)
- (2) limit temperature – lower limit of the comfort range down to which a sleeping bag user with a rolled-up body posture is globally in thermal equilibrium and just not feeling cold (related to standard man and in standard conditions of use)
- (3) comfort temperature – lower limit of the comfort range down to which a sleeping bag user with a relaxed posture such as lying on the back is globally in thermal equilibrium and just not feeling cold (related to standard woman and in standard condition of use)
- (4) maximum temperature – upper limit of comfort range; the temperature up to which a partially uncovered sleeping bag user (standard man) just does not perspire too much





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.**

Insulation of sleeping bag varies widely with the conditions of use (wind, radioactive 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 temperature of the range of utility as determined in this European standard 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 and therefore shall 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 thermal balance of the whole body. The human body is very sensible to local discomfort a local thermal bridge may not influence the global insulation of the sleeping bag, but greatly affects sensation of cold of the sleeping bag user. It shall be emphasised that the test method in this European Standard 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 shall fabric of the sleeping bag is air permeable.

In this European Standard sleeping bags are considered as dry: high moisture content may lower thermal performance.

Vladimír Štork  
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