



TEST REPORT *)

Applicant: L'Isolante K-FLEX S.r.l.
I-20040 Roncello (MI)/Italy

Content: Determination of the expansion coefficient following EN 1604 in the temperature range + 20 to – 190 °C

Material: „K-Flex ST”

Material Identification: Sheet material out of flexible elastomeric foam with skins. Nominal thickness: 25 mm
Density: 60 kg/m³

Sampling: The samples were taken on 20th June 2001 at the plant Roncello/Italy by employee of FIW.

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Date: October 4, 2002

Total pages: 2

Procedure:

The test specimens with the dimensions 180 mm x 80 mm x 25 mm have been conditioned for 48 hours at 20 °C and the length, the width and thickness have been measured with a calliper with a maximum uncertainty of $\pm 0,1$ mm.

The test specimens were stored vertically in liquid Nitrogen over 1 hour and temperature of liquid nitrogen has been recorded by a thermo couple.

Immediately after 1 hour storage at $-191 \text{ °C} \pm 3 \text{ K}$ the test specimen was put between two polystyrene foam boards to avoid greater temperature changes and length, width and thickness were measure by a calliper again.

Totally 3 test specimens have been stored in liquid nitrogen and measured again.

Test results:

All test specimens showed in all 3 measured directions a contraction.
The changes for the different directions are:

length:	- 2,8 mm;	- 3,0 mm;	- 3,1 mm	mean:	- 3,0 mm
width:	- 1,0 mm;	- 0,8 mm;	- 1,0 mm	mean:	- 1,0 mm
thickness:	- 0,7 mm;	- 0,5 mm;	- 0,5 mm	mean:	- 0,6 mm

The mean expansion coefficients in the temperature range + 20 °C to -191 °C are:

length	$a = - 80 \cdot 10^{-6}/\text{K}$
width	$a = - 55 \cdot 10^{-6}/\text{K}$
thickness	$a = - 110 \cdot 10^{-6}/\text{K}$

Remarks:

The test specimens showed no bowing during the test and no significant damages.

Gräfelfing, October 4, 2002 WA-rb

Test expert



Dipl.-Ing. (FH) W. Albrecht



Tester



H. Perk