LGAI

LGAI TECHNOLOGICAL CENTER, S.A
Campus UAB
Ronda de la Font del Carme, s/n
08193 Bellaterra (Barcelona)
Tlf. 93 567 20 00 Fax: 93 567 20 01

REPORT Nº: 16/31707725

TEST REPORT ISSUED BY LGAI TECHNOLOGICAL CENTER, S.A.

CLIENT IDENTIFICATION DETAILS

NAME: EA Consulting Pvt, Ltd
ADRESS: AL-9, 15th Lane, Phase VII, Khayaban-e-Hilal, D.H.A.
CITY: KARACHI
REGION: PAKISTAN
And on its behalf Mr. Tanvir Mustafa Mirza.

SAMPLE IDENTIFICATION DETAILS

PRODUCT: Sample of rubber bearing pad.
REFERENCE: Ref. GREEN LINE PROJECT BUS RAPID TRANSIT SYSTEM.

NOTES: ------
DELIVERY DATE: 15/10/2016

PHYSICAL AND CHEMICAL TEST LAB.

Start: 28/10/2016 Finish: 28/11/2016

REQUESTED TEST

Tests of physical properties of the rubber.

METHODE TEST

As per ASTM standards.

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==RESULTS==

SAMPLE REF. GREEN LINE PROJECT BUS RAPID TRANSIT SYSTEM

1- **Shore-A hardness as per ASTM D-2240**

The hardness test ASTM D-2240 has been made a temperature of 23±2ºC in a DIGITEST BAREISS hardness tester, serial number 108257.

Obtained value..... 61 Shore-A units.

Prescribed value..... 60 ± 5 units Shore-A.

2- **Tensile strength as per ASTM D-412**

The tests have been made as per ASTM D-412 a machine trademark INSTRON, model 3365, serial number J5265 of 5 KN of maximum capacity at a clamp separation speed of 500 mm/min. and a temperature of 23±2ºC.

2.1 Elongation at break

Obtained value..... 403 %

Prescribed value..... min. 350 %

2.2 Tensile strength

Obtained value..... 210,3 Kg/cm²

Prescribed value..... min. 160 kg/cm²

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3- **Tear strength as per ASTM D-624 Die C**

The test has been made as per ASTM D-624 Die C, in a machine trademark INSTRON, model 3365, serial number J5265 of 5 KN of maximum capacity at a clamp separation speed of 500 mm/min. and a temperature of 23±2ºC.

Obtained value..... 58,3 kg/cm

Prescribed value..... min. 13 kg/cm

4- **Compression set as per ISO 815**

Compression at 25% during 22 hours at 70ºC of temperature.

Obtained value..... 14,1 %

Prescribed value..... max. 25 %

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5- **Variation after aging as per ASTM D-573**

After 70 hours at 100°C of temperature.

5.1 Elongation at break variation

Elongation at break..... 349 %

Obtained value..... - 13,4 %

Prescribed value..... max. - 50 %

5.2 Tensile strenght variation

Tensile strength..... 211,5 Kg/cm²

Obtained value..... + 0,6 %

Prescribed value..... max. ± 15 %

5.3 Hardness variation

Obtained value..... + 2 Shore-A units.

Prescribed value..... max. + 10 Shore-A units

6- **Low temperature stiffness as per UNE 53568 Gehman test**

The Gehman test was performed according to standard UNE 53568 the fluid used for the cooling has been ethyl alcohol. A torsion wire with a constant of 0.049 mN.m/° has been used. The torsion angle versus the temperature for each of the specimens is determined.

According to Table 1 of the Standard, the torsion angle is determined for each of the specimens according to the relative modules, MR 2, 5, 10 and 100. With the values of the torsion angles and from the curve of angles torsion versus temperature the vàlues of T2, T5, T10 and T100 in °C are determined. The aparent torsional modulus of rigidity was obtained at two diferent temperatures (25°C and – 35°C) according to the equation definen in section 7.3 of the above norm.

Values of torsion angles, º	
25ºC	153
MR-2	133
MR-5	96
MR-10	65
MR-100	10
Temperature , ºC	
T2	-17.8
T5	-25.7
T10	-29.6
T100	-36.1

Torsión Module

G (25 º)= 242.9 MPa
G (-35 º)= 2.655 MPa = 27.07 kg/cm²

No crack in sample was found.

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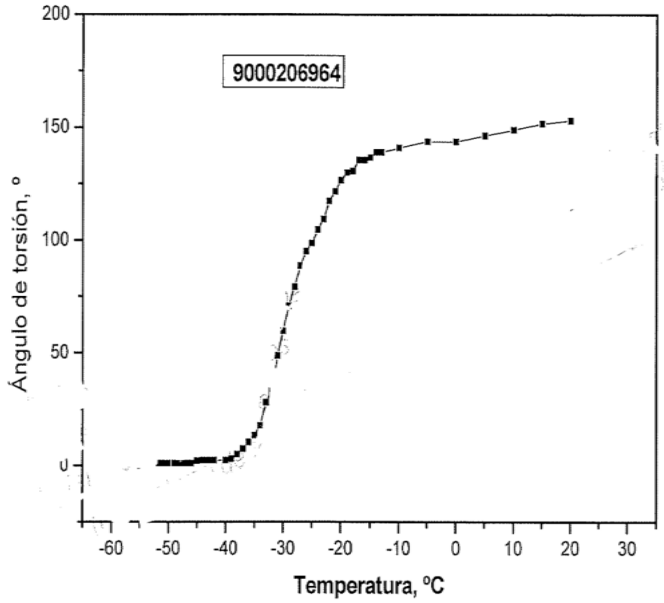

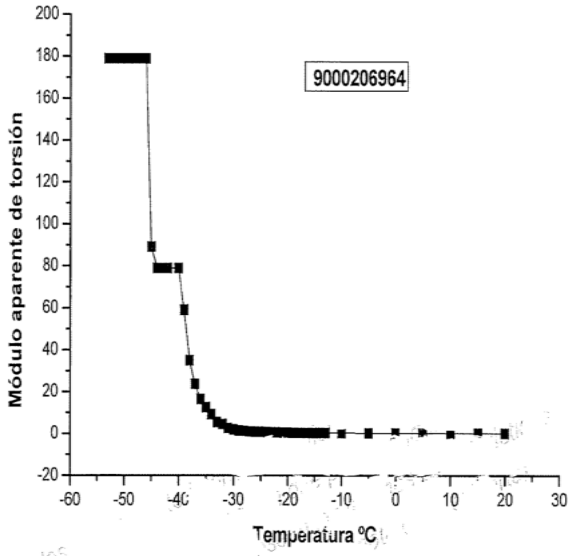

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7- **Ozone resistance as per ASTM D-1149**

The ozone resistance as per ASTM D-1149, has been made in a OREC ozone chamber, model 03DM-100 series number DM-332 with the following characteristics:

Concentration: 100±20 pphm

Temperature: 38±1°C

Deformation: 20 %

Obtained value:

After being in the ozone chamber during 100 hours, we can not appreciate fissures at first sight.

Prescribed value..... without cracks.

Albert Alier García
Technical Responsible of the test
Bellaterra, November 28th 2016

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