

Qualification Report for part 6.2.6 in SNCF PSIGT-TL No 4319: Heat Ageing (thermal cycling and mechanical testing) Cubis Systems – Ultima Connect

Objective:

To determine the heat ageing performance of materials, by thermally cycling the material and testing the mechanical performance. The results should show no variation or deviation of more than 5% due to the thermal cycling.

Test Specimens:

4 panels SMC0200 5279-7022 which will be cut into 10 test pieces per mechanical test.

Test equipment:

Oven/ Incubator capable of 70° centigrade
Freezer capable of -20° centigrade
Instron mechanical tester
Zwick Charpy Impact tester

Date of testing:

Thermal Cycling: 20/4/15

Mechanical Testing: 5/5/15

Method:

A) Thermal cycling

The panels were subjected to 30 cycles of 12 hours at -20°C and 70°C equating to 15 days thermal cycling.

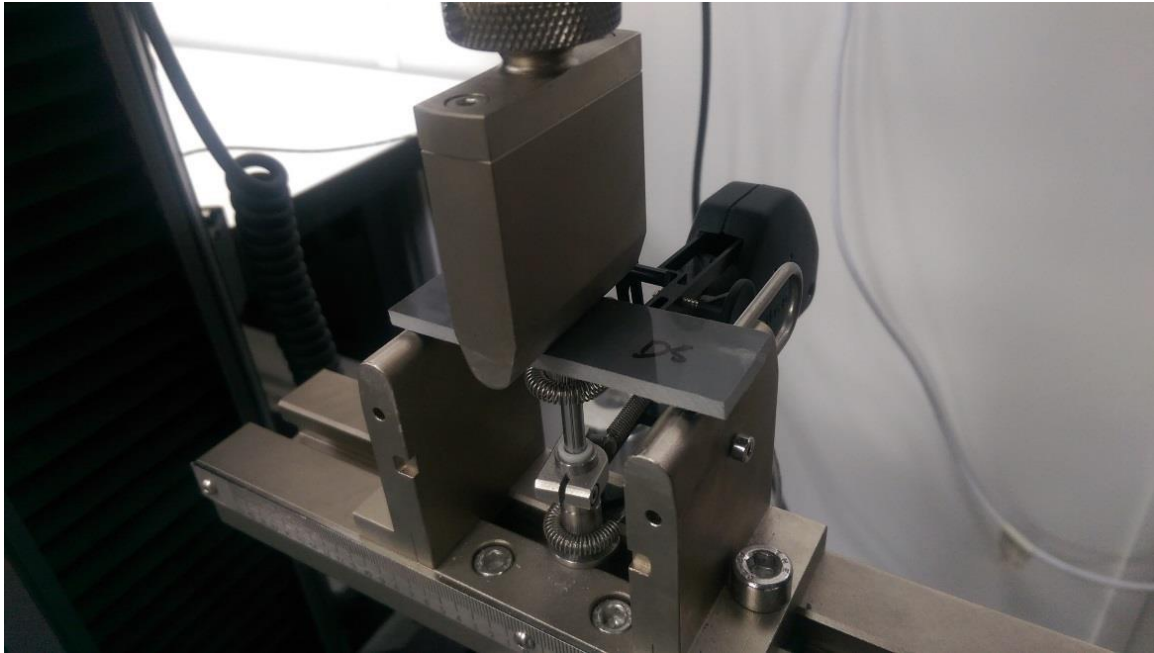
The panels are to be stood in each environment, so that there is a maximum amount of panel available to the heat or the cold.

B) Mechanical Testing:

i) Flexural

- 1 The Flexural mechanical testing of the test plaques conforms to EN ISO 14125.
- 2 Cut the 10 test specimens to 80mm (L) x 25mm (W) x 4mm (T), from the panels.
- 3 Measure, using a micrometre accurate to 3 decimal places.
- 4 Testing performed on a modern Instron 5967 machine, 3 point Flexural, as per part 9 Procedure with a test speed of 5mm/min and the span as per part 6.1.3 and part 9.2 which we determine as a x16 factor of the mean of the thickness of the pieces.

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ii) Tensile

- 1 The Tensile mechanical testing of the test plaques conforms to EN ISO527 Pt 4:
- 2 Cut the 10 test specimens to 250mm (L) x 25mm (W) x 4mm (T), from the panels.
- 3 Measure, using a micrometer accurate to 3 decimal places.
- 4 Testing performed on the Tensile section of a modern Instron 5967 machine, with a test speed of 2mm/min.

iii) Charpy Impact

- 1 The Impact mechanical testing of the test plaques conforms to EN ISO 179 :
- 2 Cut the 10 test specimens to 80mm (L) x 10mm (W) x 4mm (T), from the panels.
- 3 Measure, using a micrometer accurate to 3 decimal places.
- 4 Testing performed on a Zwick Charpy impact tester, with a 4J hammer.

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Results Summary:

	Control Sample		15 Day Thermal Cycled		% Change $\leq \pm 5$
	Result	Standard Deviation	Result	Standard Deviation	
Flexural Strength (MPa)	126	11.4	131	7.7	4.0
Flexural Modulus (GPa)	10.9	0.6	11.4	0.8	4.6
Tensile Strength (MPa)	46	6.8	44	3.8	-4.3
Impact (kJ/m²)	33	4.2	33	6.4	0.0