



REPORT No. 063745-001-1-a (M1)

CUSTOMER	TECNOLOGIA NAVARRA DE NANOPRODUCTOS, S.L
APPLICANT	IDOIA SANCET SESMA
ADDRESS	Área Industrial Perguita, C/A N° 1 31210 Los Arcos (Navarra)
PURPOSE	DETERMINATION OF LUMINOUS AND SOLAR CHARACTERISTICS IN ACCORDANCE WITH UNE-EN 410:2011
SAMPLE TESTED	COATED GLASS REF. «Tecnadis HEATSHIELD»
DATE OF RECEIPT	20.12.2016
TEST DATES	13.01.2017 – 16.01.2017
DATE ISSUED	07.04.2017
DATE OF MODIFICATION	08.05.2017

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- * In case of a lawsuit, the original Spanish version shall be taken as reference.
- * This report modifies and replaces the test report nº 063745-001-1-a

CHARACTERISTICS OF THE SAMPLES

On the 20th December 2016, TECNALIA received from the company TECNOLOGIA NAVARRA DE NANOPRODUCTOS, S.L., three test specimens of coated glass measuring (100 x 100 x 4) mm and referred to as:

«Tecnadis HEATSHIELD»

The total thickness of the test specimens ranges from 3.78 to 3.81 mm.

TEST REQUESTED

The test requested is the **determination of luminous and solar characteristics** in accordance with UNE-EN 410:2011 standard «*Glass in building. Determination of luminous and solar characteristics of glazing*»

REASON FOR THE MODIFICATION: Correction of a mistake in the text.

TEST CARRIED OUT

The determination of the transmittance and reflectance between 280 and 2,500 nm was carried out using a Perkin-Elmer Spectrometer Lambda 900 UV/VIS/NIR spectrophotometer with an integrating sphere of 150 mm in diameter, quartz standard and white standard.

The method used has the following characteristics:

- Wavelength interval: 5 nm
- Scan speed: 284.6 nm/min
- Slit UV/VIS:1
- Detector gain NIR:4

Three transmittance measurements and three reflectance measurements on both sides of the test specimen were taken.

From the transmittance and reflectance measurements, the **solar direct transmittance and reflectance, light transmittance and reflectance** and **solar factor** of the test specimen were calculated in accordance with standard UNE-EN 410:2011.

The corrected emissivity considered on the internal surface, the side without the coating, is that of a surface of base soda lime silicate glass which in accordance with standard UNE-EN 673:2011 is 0.837. The corrected emissivity of the external surface, the coated face, is 0.80; see test report 063745-002 issued by TECNALIA on the 7th of April 2017.

UNE-EN 410:2011 does not specify that the exterior surface of the glazing could have a different emissivity than a base soda lime silicate glass. Therefore, when calculating the solar factor, the corrected emissivity of the exterior surface is 0.837.

RESULTS

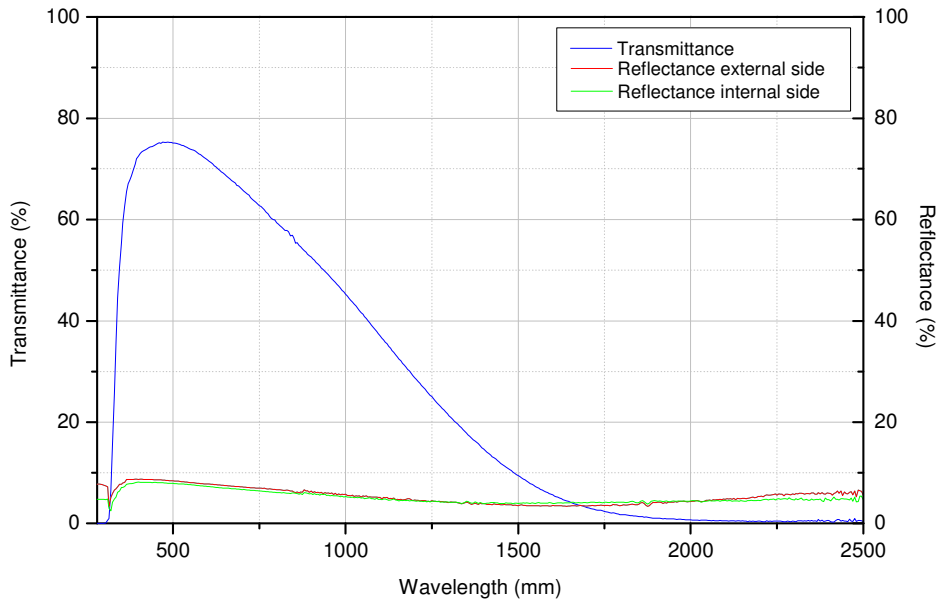
The results of the luminous and solar characterization of the test specimen referenced as «Tecnadis HEATSHIELD» are:

Light transmittance (%)	73.4 ± 0.5
Light reflectance (%) ^(*)	8.1 ± 0.1
Light reflectance (%) ^(**)	7.6 ± 0.2
Solar direct transmittance (%)	55.4 ± 0.4
Solar direct reflectance (%) ^(*)	6.8 ± 0.1
Solar direct reflectance (%) ^(**)	6.4 ± 0.1
Solar factor (Expressed per unit)	0.64 ± 0.01

(*) Measured in the direction of the incident radiation (Coated face)

(**) Measured in the direction opposite to the incident radiation (Non-coated face)

The following graph shows the data of the spectral transmittance and the reflectance on both sides of the test specimen.



DECLARATION OF UNCERTAINTY

The expanded uncertainty of measurement has been obtained by multiplying the standard uncertainty by the coverage factor $k=2$ which, for a normal distribution, corresponds to a coverage probability of approximately 95%.

Note: Uncertainty value after \pm symbol.