



Decoral LAB
Research and Development



Accelerated Weathering Test Natural Exposure Test



MRK-010-0895



HAVANA
series

TEST DI INVECCHIAMENTO ACCELERATO:

Invecchiamento accelerato

Tutti i campioni vengono sottoposti all'irraggiamento di lampade allo xenon ed a cicli umido/secco mediante speciali apparecchiature (Q-Sun, SolarBox). Tali apparecchiature vengono utilizzate in conformità agli standard internazionali imposti dalla norma ISO 11341 rispettando le seguenti impostazioni:

- intensità luminosa, $550 \pm 20 \text{ W/m}^2$ (290-800 nm)
- temperatura del pannello nero, $65 \pm 5^\circ\text{C}$
- ciclo umido 18 minuti
- ciclo secco 102 minuti

Alla fine dei test, che normalmente hanno una durata minima di 1000 ore, viene valutata la variazione di brillantezza (EN ISO 2813, con angolo di incidenza 60°) ed il cambiamento di colore ΔE (metodo CIELAB ISO 7724/3) rispetto ai valori di partenza. Questo permette di stabilire, in maniera parametrizzata, l'invecchiamento delle varie superfici testate. La corretta conduzione dei test viene verificata attraverso l'utilizzo di campioni in bianco ad invecchiamento noto.



Figure: apparecchiature per l'invecchiamento accelerato.
Pictures: equipment for the Accelerated Weathering Test

Accelerated Weathering Test

All samples are exposed to radiation of Xenon lamps and to wet/dry cycles by special equipment (Q-Sun, SOLARBOX). Such equipment is used in accordance with international standards imposed by norm ISO 11341, i.e. complying with the following settings:

- light intensity, $550 \pm 20 \text{ W / m}^2$ (290-800 nm)
- black panel temperature, $65 \pm 5^\circ\text{C}$
- wet cycle 18 minutes
- dry cycle 102 minutes.

At the end of the test, whose minimum duration is 1000 hours, Residual Gloss (EN ISO 2813, with an angle of incidence 60°) and Colour Variation ΔE (CIELAB method - ISO 7724 / 3) are measured comparing pre-test values. In this way it is possible to evaluate the aging of surfaces using standard indexes. The accuracy of the test is verified through the use of samples in white, whose aging behaviour is known.

ESPOSIZIONE NATURALE IN FLORIDA:

Esposizione naturale

Le esposizioni naturali vengono condotte in Florida presso il sito espositivo della Atlas Weathering Service; il sud della Florida fornisce infatti un clima caldo umido e ad alto irraggiamento UV. Invecchiamento naturale: tutti i campioni vengono sottoposti all'irraggiamento naturale in Florida. L'esposizione viene effettuata, in conformità allo standard internazionale descritto nella ISO 2810, rispettando le seguenti specifiche:

- esposizione del pannello in direzione sud
- angolo di inclinazione del pannello 5°
- pannello scoperto sul retro

Al termine del periodo di esposizione, pari a 12 mesi, viene valutata la variazione di brillantezza (EN ISO 2813, con angolo di incidenza 60°) ed il cambiamento di colore ΔE (metodo CIELAB ISO 7724/3) rispetto ai valori di partenza. Anche l'esposizione naturale viene monitorata attraverso l'invio di campioni in bianco ad invecchiamento noto.

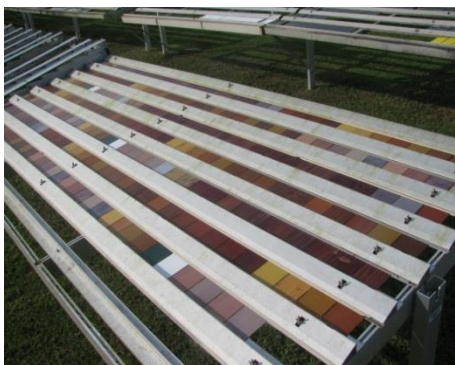








Figure: Esposizione naturale, campioni esposti all'AWSG in Florida
Pictures: Florida Natural Exposure, test samples

Natural Exposure Test

Natural Exposure Tests are conducted in Atlas Weathering Service Sites – Florida. South Florida climate indeed is hot, wet and highly exposed to UV-rays. All samples are subjected to natural irradiation in Florida according to the international standard ISO 2810, i.e. complying with the following specifications:

- facing south
- tilt angle 5° from the horizontal
- open backing.

After 12 months exposure period, residual gloss (EN ISO 2813, with an angle of incidence 60°) and colour variation ΔE (CIELAB method - ISO 7724 / 3) are measured comparing pre-test values. Even the Natural Exposure Test accuracy is verified by through the use of samples in white, whose aging behaviour is known.

ID Test Report	PROD. VERNIC	COD. FILM	PROG. N°	IMMAGINI
TR-IA-52-2018	DS 730	2504/03	52	
TR-IA-23-2011	DS-0716S	2504/01	23	
TR-IA-53-2018	DS 742	2504/03	53	
TR-IA-49-2018	DS 721	2504/01	49	
TR-IA-50-2018	DS 706	2504/02	50	
TR-IA-51-2018	DS 772	2504/02	51	



Laboratory
Test

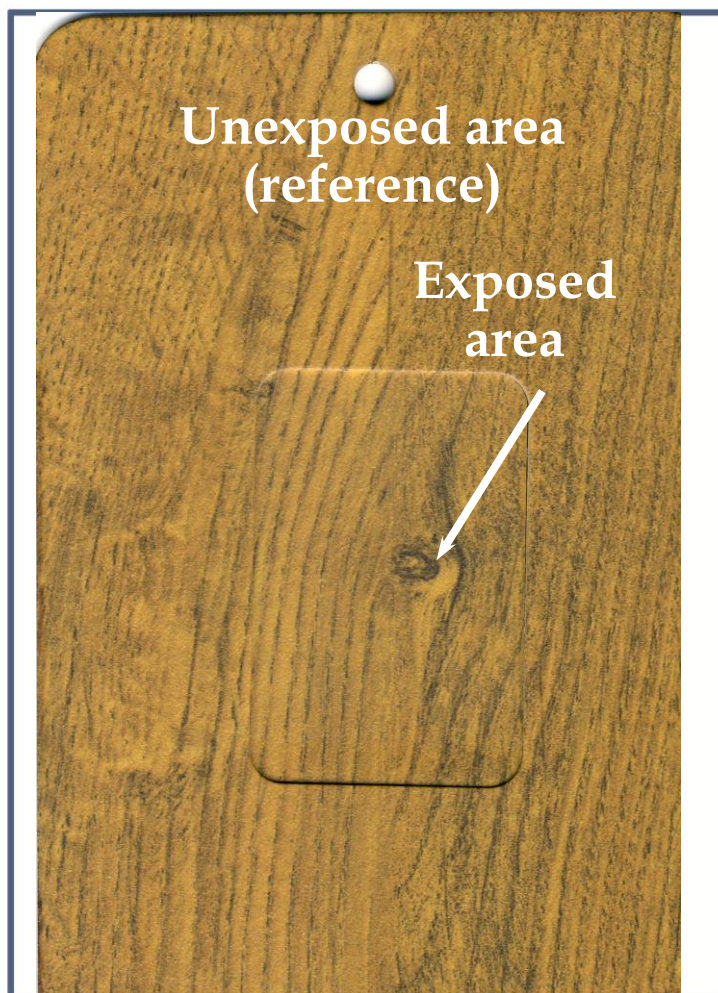
No. 294



Device:
Qsun 3000



Total duration:
953h



LAB. ID NUMBER: 24275
POWDER COATING: DS-0716S
HEAT TRANSFER FILM: 2504/01L
colour variation (ΔE): 1,26
residual gloss: 99%

Technical Remarks

Excellent residual gloss and very low colour variation (ΔE), after 953 hours on decorated sample.

Technical Opinion:

**Suitable for
OUTDOOR USE**

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers. However, the resistance against accelerated weathering test is only one of the conditions necessary for the evaluation of the resistance of the finished product. For a final assessment see further analysis on natural exposure in Florida.



Laboratory
Test

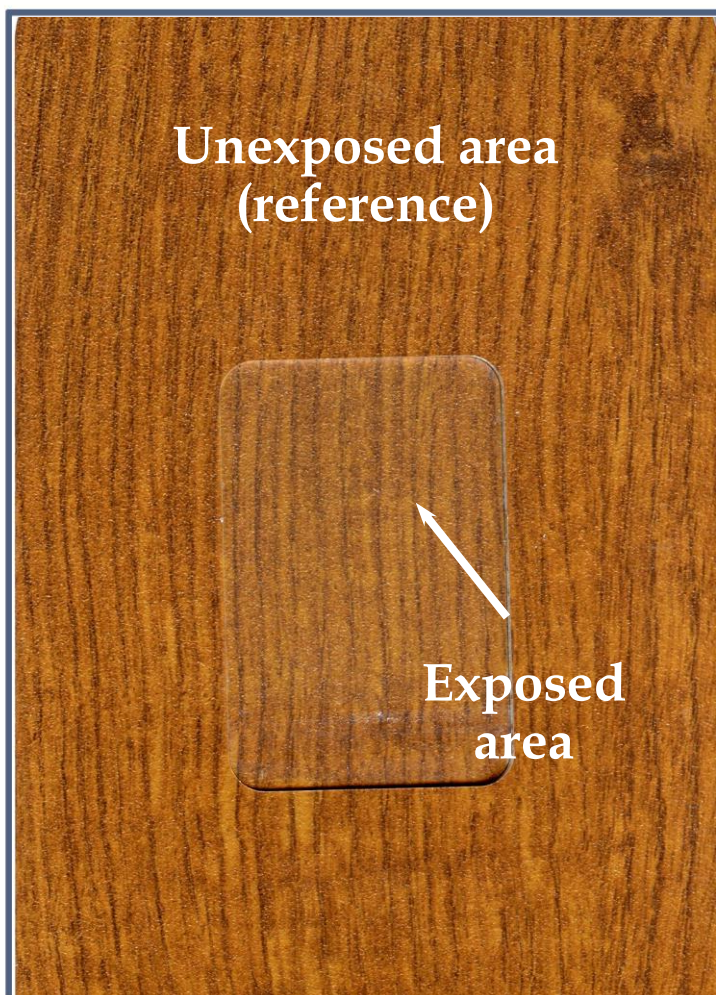
No. 519



Device:
Sol 3000e



Total duration:
1019 h



LAB. ID NUMBER: 43325
POWDER COATING: DS 721
HEAT TRANSFER FILM: 2504/01
Colour Variation (ΔE): **1,48**
residual gloss: **88%**

Technical Remarks

Excellent residual gloss and low colour variation (ΔE),
after 1019 hours.

Technical Opinion:

**Suitable for
OUTDOOR USE**

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers. However, the resistance against accelerated weathering test is only one of the conditions necessary for the evaluation of the resistance of the finished product. For a final assessment see further analysis on natural exposure in Florida.



Laboratory
Test

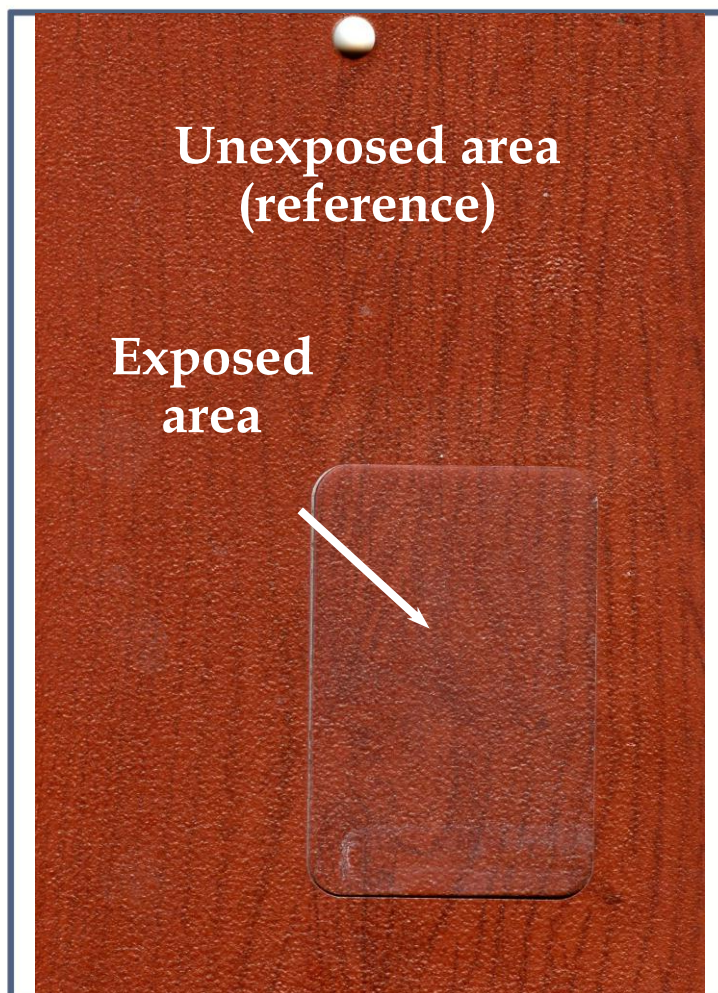
No. 519



Device:
Sol 3000e



Total duration:
1019 h



LAB. ID NUMBER: 43329
POWDER COATING: DS 706
HEAT TRANSFER FILM: 2504/02
Colour Variation (ΔE): **1,34**
residual gloss: **83%**

Technical Remarks

Excellent residual gloss and low colour variation (ΔE),
after 1019 hours.

Technical Opinion:

**Suitable for
OUTDOOR USE**

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers. However, the resistance against accelerated weathering test is only one of the conditions necessary for the evaluation of the resistance of the finished product. For a final assessment see further analysis on natural exposure in Florida.



Laboratory
Test

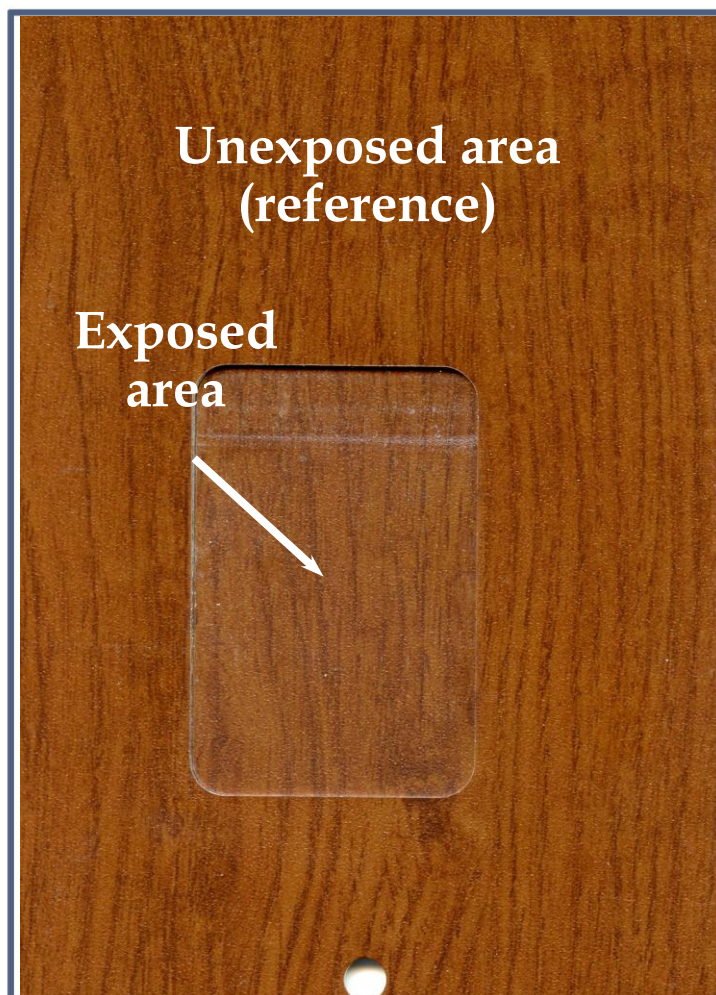
No. 519



Device:
Sol 3000e



Total duration:
1019 h



LAB. ID NUMBER: 43332
POWDER COATING: DS 772
HEAT TRANSFER FILM: 2504/02
Colour Variation (ΔE): 1,18
residual gloss: 87%

Technical Remarks

Excellent residual gloss and low colour variation (ΔE),
after 1019 hours.

Technical Opinion:

**Suitable for
OUTDOOR USE**

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers. However, the resistance against accelerated weathering test is only one of the conditions necessary for the evaluation of the resistance of the finished product. For a final assessment see further analysis on natural exposure in Florida.



Laboratory
Test

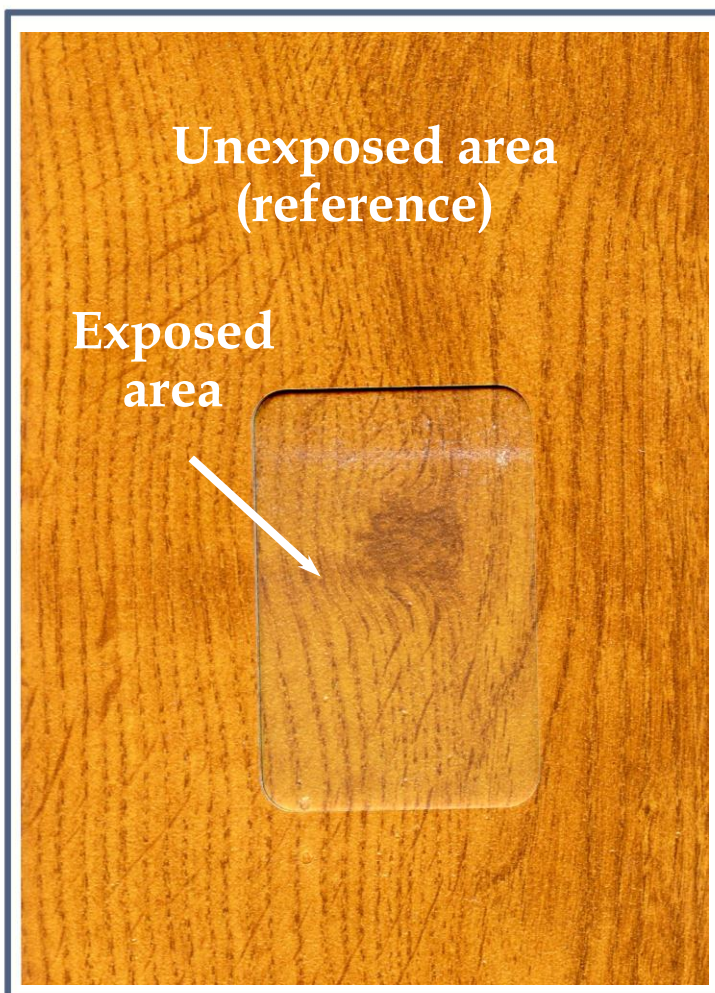
No. 519



Device:
Sol 3000e



Total duration:
1019 h



LAB. ID NUMBER: 43333
POWDER COATING: DS 730
HEAT TRANSFER FILM: 2504/03
Colour Variation (ΔE): **1,68**
residual gloss: **90%**

Technical Remarks

Excellent residual gloss and low colour variation (ΔE),
after 1019 hours.

Technical Opinion:

**Suitable for
OUTDOOR USE**

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers. However, the resistance against accelerated weathering test is only one of the conditions necessary for the evaluation of the resistance of the finished product. For a final assessment see further analysis on natural exposure in Florida.



Laboratory
Test

No. 519



Device:
Sol 3000e



Total duration:
1019 h



LAB. ID NUMBER: 43335
POWDER COATING: DS 742
HEAT TRANSFER FILM: 2504/03
Colour Variation (ΔE): **1,08**
residual gloss: **85%**

Technical Remarks

Excellent residual gloss and low colour variation (ΔE),
after 1019 hours.

Technical Opinion:

**Suitable for
OUTDOOR USE**

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers. However, the resistance against accelerated weathering test is only one of the conditions necessary for the evaluation of the resistance of the finished product. For a final assessment see further analysis on natural exposure in Florida.