Decoral LAB
Research and Development

# Accelerated Weathering Test
# Natural Exposure Test


## CAPUCCINO
### series

MRK-010-0883

# 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±20W/m$^2$ (290-800 nm)
- temperatura del pannello nero, 65 ± 5°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.

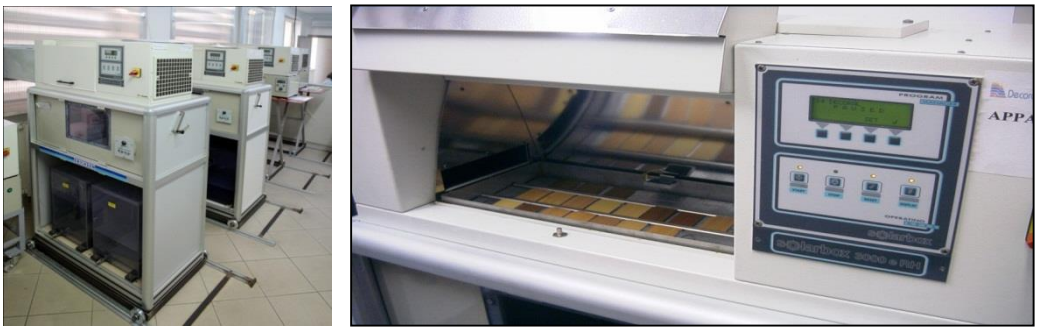


Figure: apparecchiature per l'invecchiamento accelerato.
**Pictures: equipment for the Accelerated Weathering Test**

**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 ± 20 W / m $^2$ (290-800 nm)
- black panel temperature, 65 ± 5 ° 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 know.

# 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.

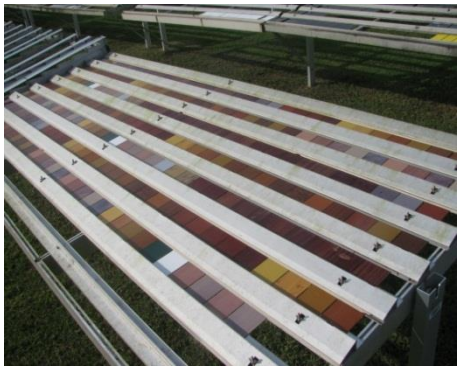


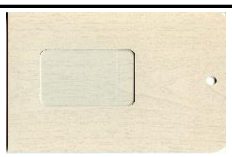
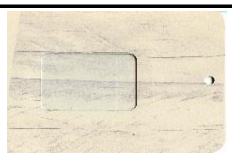
Figure: Esposizione naturale, campioni esposti all'AWSG in Florida
**Pictures: Florida Natural Exposure, test samples**

**Natural Exposure Test**

Natural Exposure Tests are conducted in Atlas Weathering Service Sites – Florida. South Florida climate indeed is hot, wet and higly 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-55-2018 | 9G-233-A005 | 2602/04 | 55 |  |
| TR-IA-56-2018 | 9G-233-A005 | 2505/10 | 56 |  |
| TR-IA-57-2018 | 9G-233-A005 | 2117/23 | 57 |  |
| TR-IA-54-2018 | 9G-233-A005 | 2120/03 | 54 |  |
| TR-IA-58-2018 | 9G-233-A005 | 2501/05 | 58 |  |
|  | 9G-233-A005 | 2502/15 |  |  |

# Test Report: Accelerated Weathering Test

Decoral LAB Research and Development

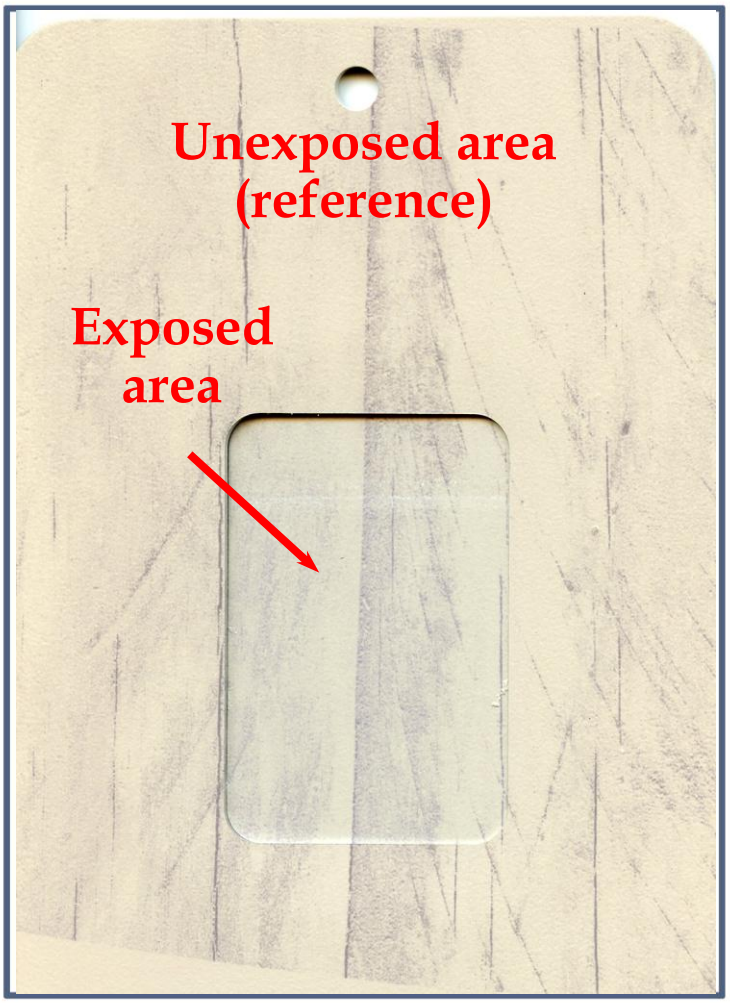


Laboratory Test

No. 516

Device: Sol 3000eN

Total duration: 1198 h




LAB. ID NUMBER: 43255
POWDER COATING: 9G-233-A005
HEAT TRANSFER FILM: 2120/03
Colour Variation (ΔE): **0,59**
residual gloss: **94%**

## Technical Remarks

Excellent residual gloss and low colour variation (ΔE), after 1198 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.

# Test Report: Accelerated Weathering Test

Decoral LAB Research and Development

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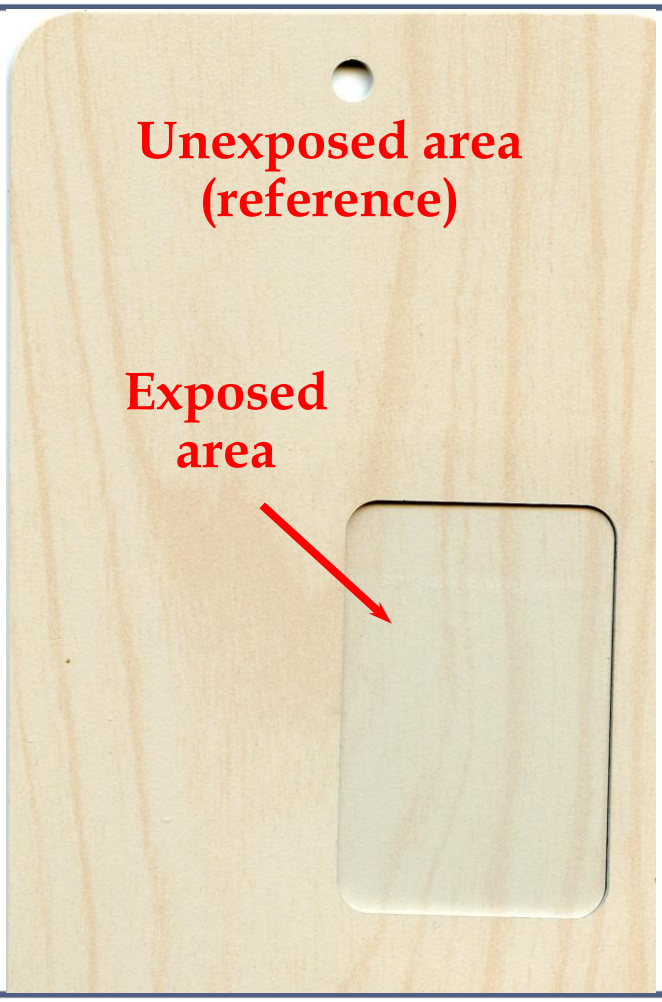
Laboratory Test

No. 516

Device: Sol 3000eN

Total duration: 1198 h




LAB. ID NUMBER: 43256
POWDER COATING: 9G-233-A005
HEAT TRANSFER FILM: 2602/04
Colour Variation (ΔE): **0,35**
residual gloss: **90%**

## Technical Remarks

Excellent residual gloss and low colour variation (ΔE), after 1198 hours.

Technical Opinion:

**Suitable for OUTDOOR USE**

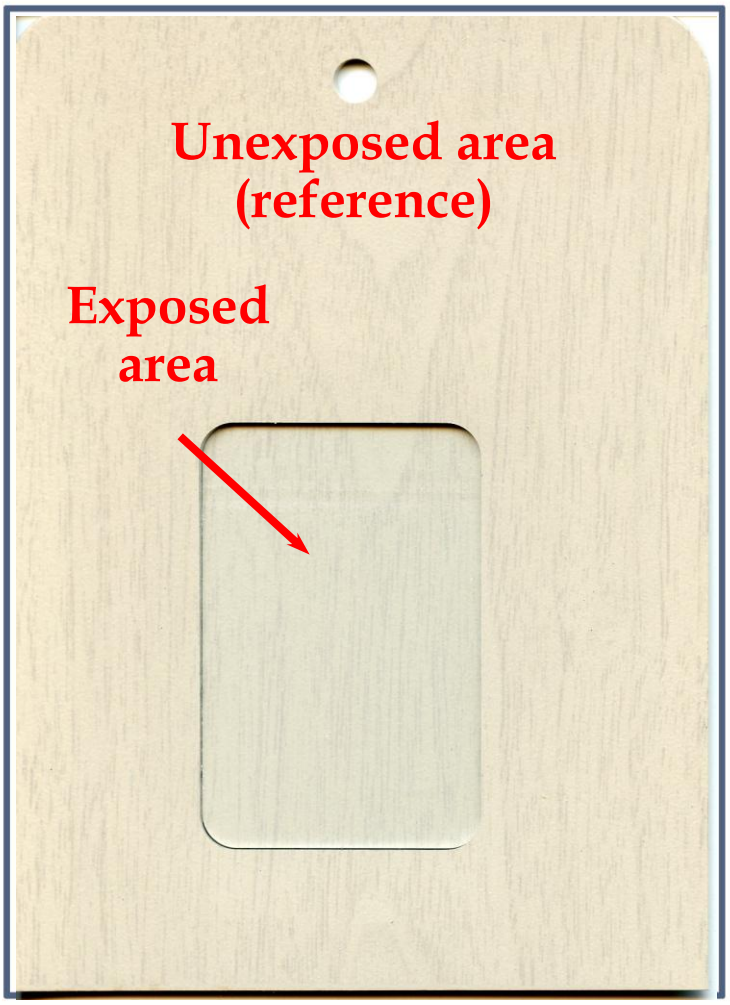
Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers. However, the resistance against accelerated weathering test is only one of the conditions necessary for the evaluation of the resistance of the finished product. For a final assessment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

Laboratory Test

No. 516

Device: Sol 3000eN

Total duration: 1198 h




LAB. ID NUMBER: 43257
POWDER COATING: 9G-233-A005
HEAT TRANSFER FILM: 2505/10
Colour Variation (ΔE): **0,36**
residual gloss: **96%**

## Technical Remarks

Excellent residual gloss and low colour variation (ΔE),
after 1198 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.

# Test Report: Accelerated Weathering Test

Decoral LAB Research and Development

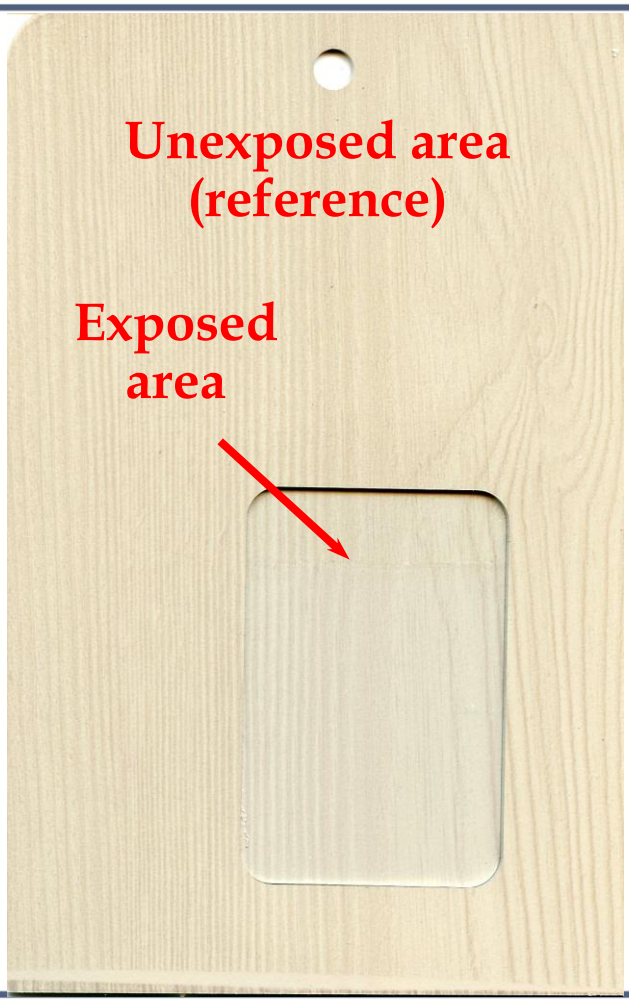
57

Laboratory Test

No. 516

Device: Sol 3000eN

Total duration: 1198 h




LAB. ID NUMBER: 43258
POWDER COATING: 9G-233-A005
HEAT TRANSFER FILM: 2117/23
Colour Variation (ΔE): **1,2**
residual gloss: **88%**

## Technical Remarks

Excellent residual gloss and low colour variation (ΔE), after 1198 hours.

Technical Opinion:

**Suitable for OUTDOOR USE**

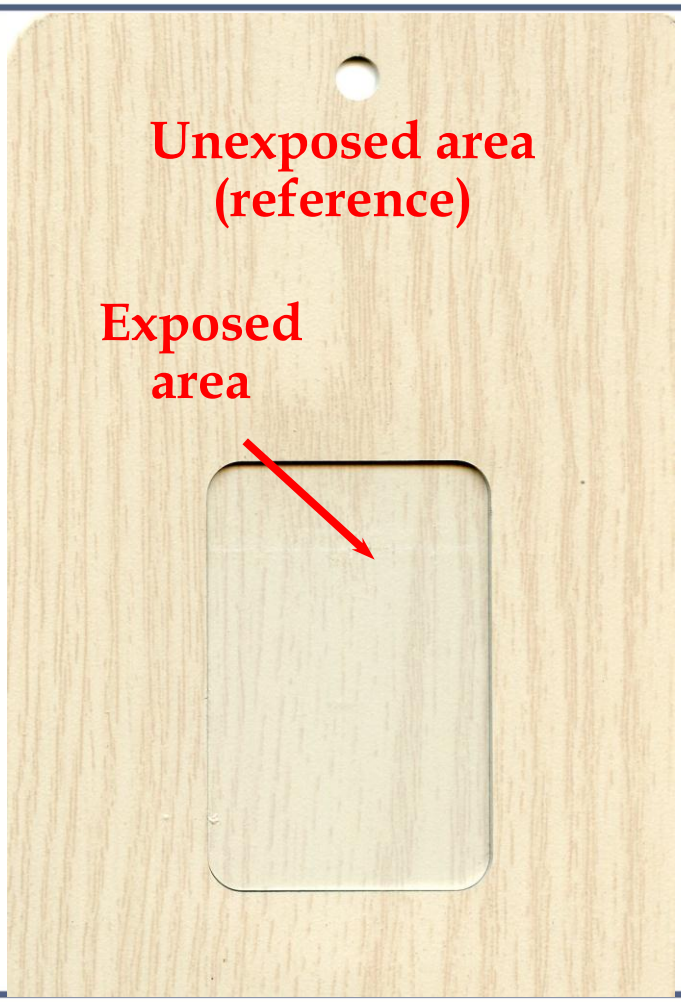
Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers. However, the resistance against accelerated weathering test is only one of the conditions necessary for the evaluation of the resistance of the finished product. For a final assessment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

Laboratory Test

No. 516

Device: Sol 3000eN

Total duration: 1198 h




LAB. ID NUMBER: 43264
POWDER COATING: 9G-233-A005
HEAT TRANSFER FILM: 2501/05
Colour Variation (ΔE): **0,62**
residual gloss: **87%**

## Technical Remarks

Excellent residual gloss and low colour variation (ΔE),
after 1198 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.