



Decoral LAB



Research and Development



Accelerated Weathering Test Natural Exposure Test



MRK-010-0563



ALLUMINIO e ORO per ESTERNO

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 16474-2 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 11664/4) 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 16474-2, 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 11664/4) 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.

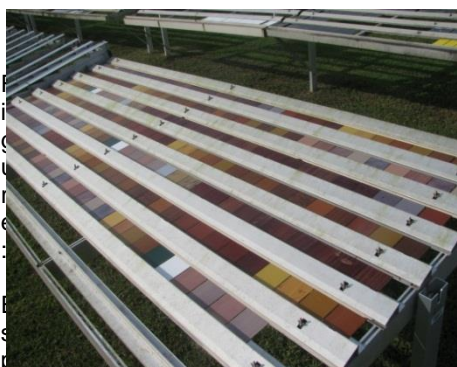
ESPOSIZIONE NATURALE IN FLORIDA:

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 11664/4) rispetto ai valori di partenza. Anche l'esposizione naturale viene monitorata attraverso l'invio di campioni in bianco ad invecchiamento noto.



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 11664/4) 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-163-2014	6C-076-A027	6053/01	163	
TR-IA-164-2014	6C-076-A027	6052/02	164	
TR-IA-168-2014	6A-139-A027	6047/04	168	
TR-IA-165-2014	6A-139-A027	6052/01	165	
TR-IA-291-2012	9A-048-A004	5007/03	291	
TR-IA-292-2012	9C-048-A004	5007/03	292	



Laboratory
Test

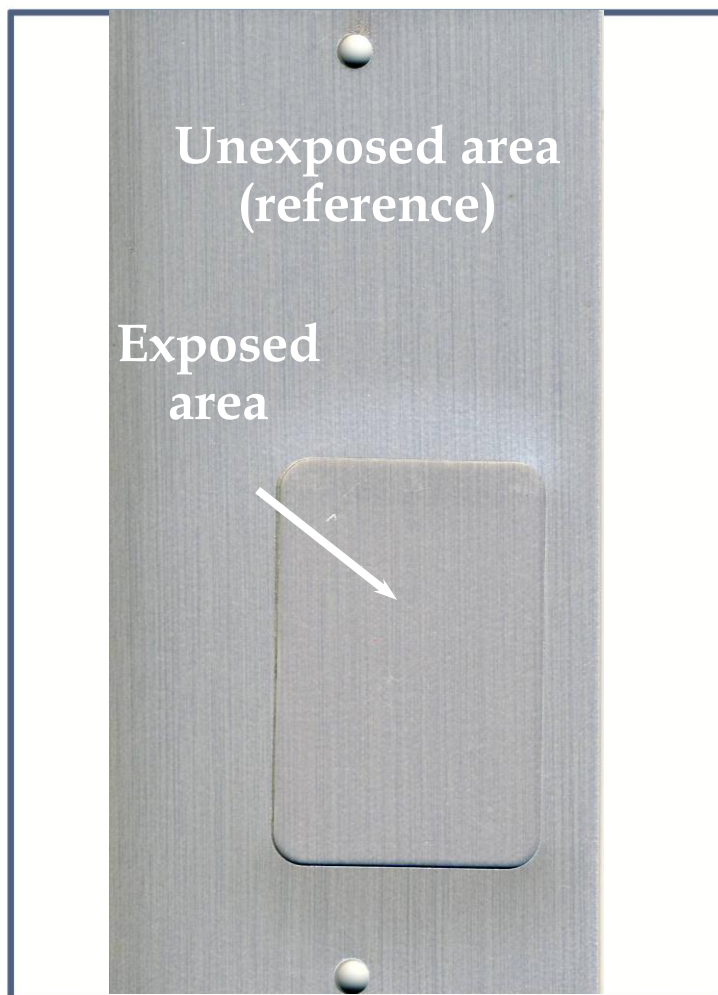
No. 421



Device:
QSun 3000



Total duration:
1213h



LAB. ID NUMBER: 35431
POWDER COATING: 6C-076-A027
HEAT TRANSFER FILM: 6053/01
colour variation (ΔE): **1,51**
residual gloss: **95%**

Technical Remarks

Excellent residual gloss and low colour variation (ΔE),
after 1213 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

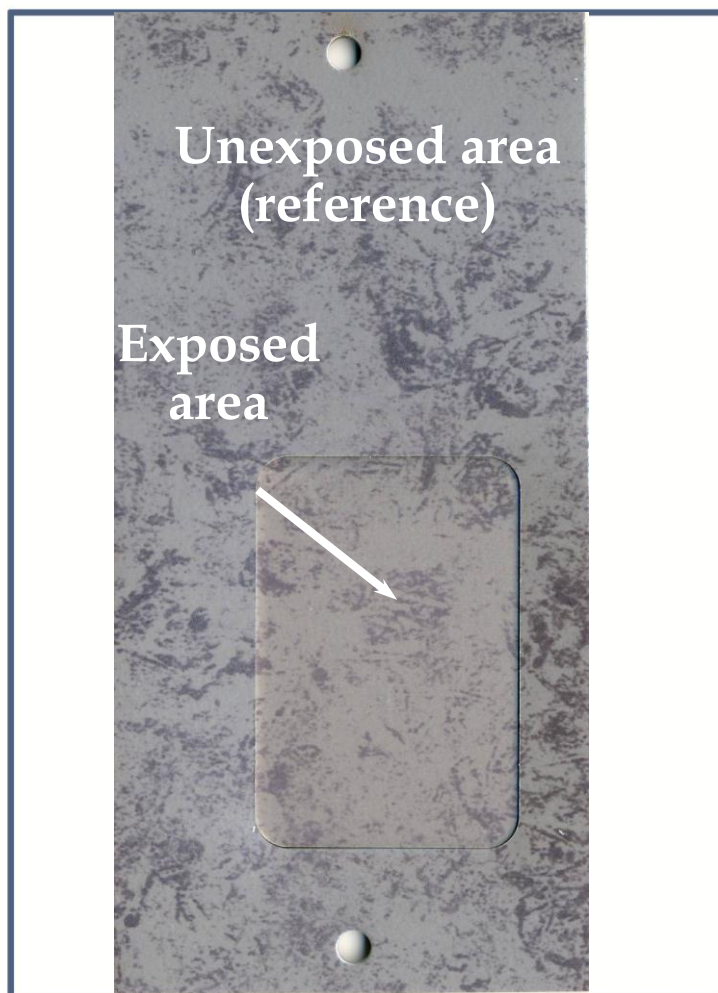
No. 421



Device:
QSun 3000



Total duration:
1213h



LAB. ID NUMBER: 35432
POWDER COATING: 6C-076-A027
HEAT TRANSFER FILM: 6052/02
colour variation (ΔE): **1,29**
residual gloss: **86%**

Technical Remarks

Excellent residual gloss and low colour variation (ΔE),
after 1213 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

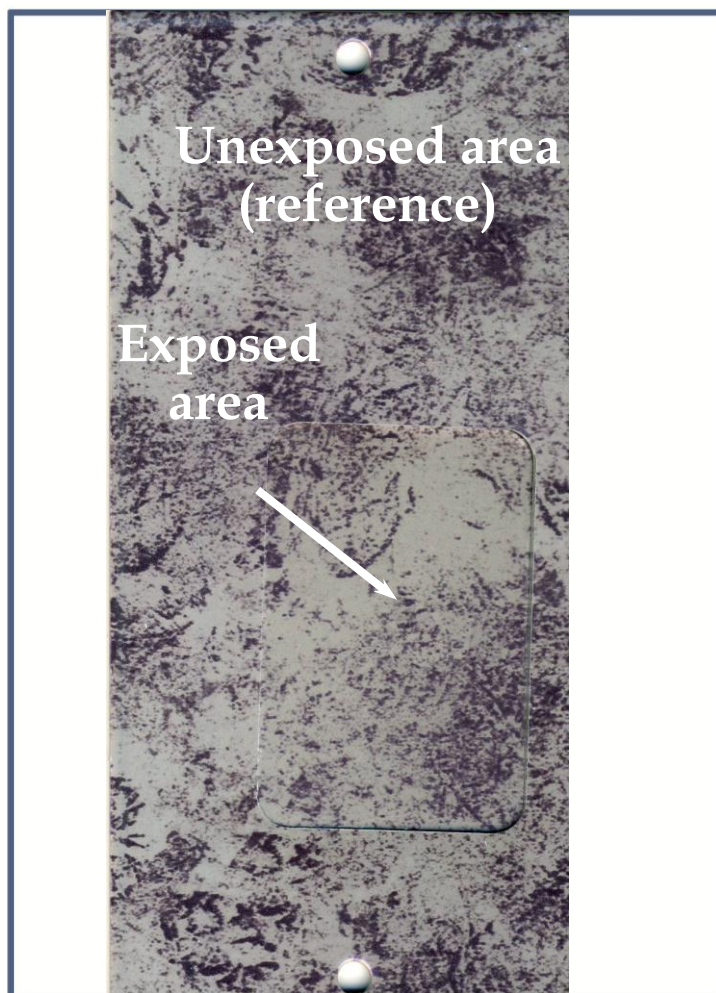
No. 421



Device:
QSun 3000



Total duration:
1213h



LAB. ID NUMBER: 35433
POWDER COATING: 6A-139-A027
HEAT TRANSFER FILM: 6052/01
colour variation (ΔE): 1,15
residual gloss: 100%

Technical Remarks

Excellent residual gloss and low colour variation (ΔE),
after 1213 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

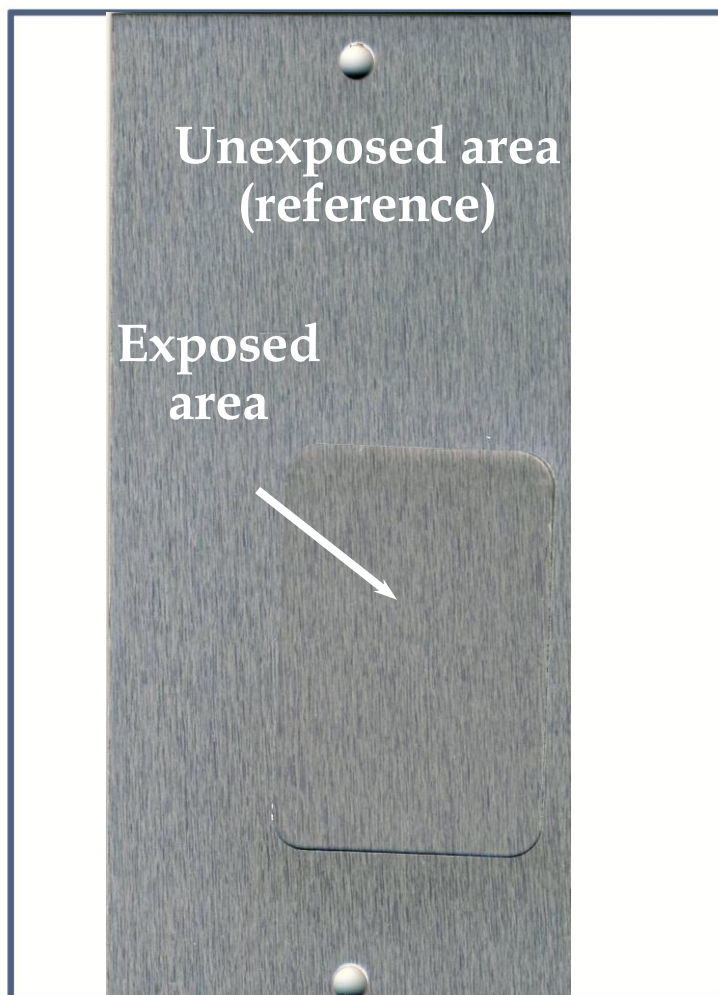
No. 421



Device:
QSun 3000



Total duration:
1213h



LAB. ID NUMBER: 35436
POWDER COATING: 6A-139-A027
HEAT TRANSFER FILM: 6047/04
colour variation (ΔE): **1,56**
residual gloss: **100%**

Technical Remarks

Excellent residual gloss and low colour variation (ΔE),
after 1213 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. 345



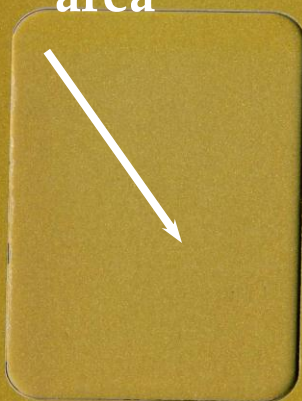
Device:
QSun 3000



Total duration:
1195h

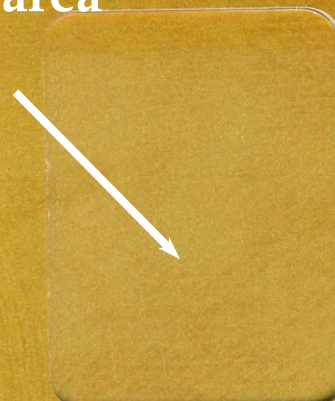
Unexposed area
(reference)

Exposed
area



Unexposed area
(reference)

Exposed
area



LAB. ID NUMBER: 27785
POWDER COATING: 9A-048-A004
HEAT TRANSFER FILM: --
Grey scale: 4
residual gloss: 94%

LAB. ID NUMBER: 27788
POWDER COATING: 9A-048-A004
HEAT TRANSFER FILM: 5007/03
Grey scale: 4
residual gloss: 105%

Technical Remarks

Excellent residual gloss and very low colour variation, after 1195 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. 345



Device:
QSun 3000



Total duration:
1195h

Unexposed area
(reference)

Exposed
area



Unexposed area
(reference)

Exposed
area



LAB. ID NUMBER: 27790
POWDER COATING: 9C-048-A004
HEAT TRANSFER FILM: --
Grey scale: 4
residual gloss: 107%

LAB. ID NUMBER: 27792
POWDER COATING: 9C-048-A004
HEAT TRANSFER FILM: 5007/03
Grey scale: 4
residual gloss: 110%

Technical Remarks

Excellent residual gloss and very low colour variation, after 1195 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.