

Gi color

S.r.l.



Accelerated Weathering Test
Natural Exposure Test



MRK 010-0686



ICE TOUCH
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-NE-25-2014	Icetouch-001	solo base	25	
TR-NE-26-2014	Icetouch-002	solo base	26	
TR-NE-27-2015	Icetouch-003	solo base	27	
TR-NE-28-2014	Icetouch-004	solo base	28	
TR-NE-29-2014	Icetouch-005	solo base	29	
TR-NE-30-2014	Icetouch-006	solo base	30	
TR-IA-24-2016	Icetouch-007	solo base	24	
TR-NE-31-2015	Icetouch-008	solo base	31	
TR-IA-22-2016	Icetouch-009	solo base	22	
TR-NE-32-2016	Icetouch-011	solo base	32	
TR-NE-33-2016	Icetouch-012	solo base	33	
TR-NE-34-2016	Icetouch-013	solo base	34	

TR-IA-25-2016	lchetouch-014	solo base	25	
TR-IA-26-2016	lchetouch-015	solo base	26	
TR-IA-27-2016	lchetouch-016	solo base	27	
TR-IA-28-2016	lchetouch-017	solo base	28	
TR-IA-29-2016	lchetouch-018	solo base	29	
TR-IA-01-2016	lchetouch-021	solo base	01	
TR-IA-02-2016	lchetouch-022	solo base	02	
TR-NE-03-2016	lchetouch-032	solo base	03	
TR-IA-30-2016	lchetouch-033	solo base	30	
TR-IA-31-2016	lchetouch-034	solo base	31	
TR-IA-36-2016	lchetouch-036	solo base	36	
TR-IA-37-2016	lchetouch-037	solo base	37	



**Laboratory
Test**

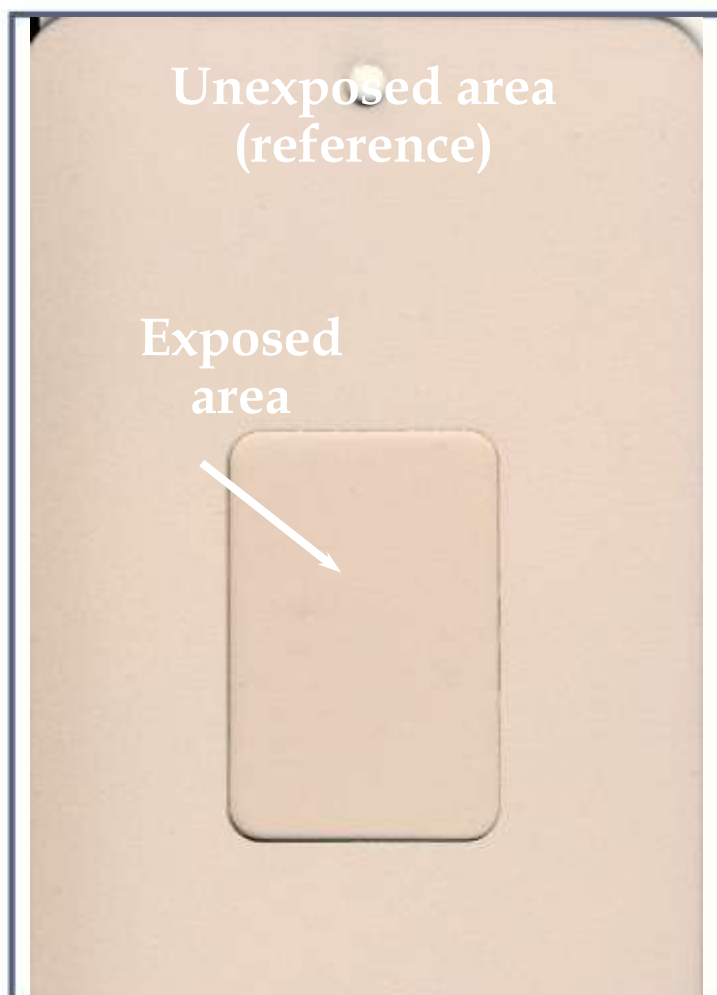
No. 354



**Device:
QSun 3000**



**Total duration:
1016h**



LAB. ID NUMBER: 28194
POWDER COATING: icetouch-021
HEAT TRANSFER FILM: --
Colour variation (ΔE): **0,73**
residual gloss: **91%**

Technical Remarks

Excellent residual gloss and very low colour variation (ΔE), after 1016 hours on sample. (\pm RAL 1013)

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**

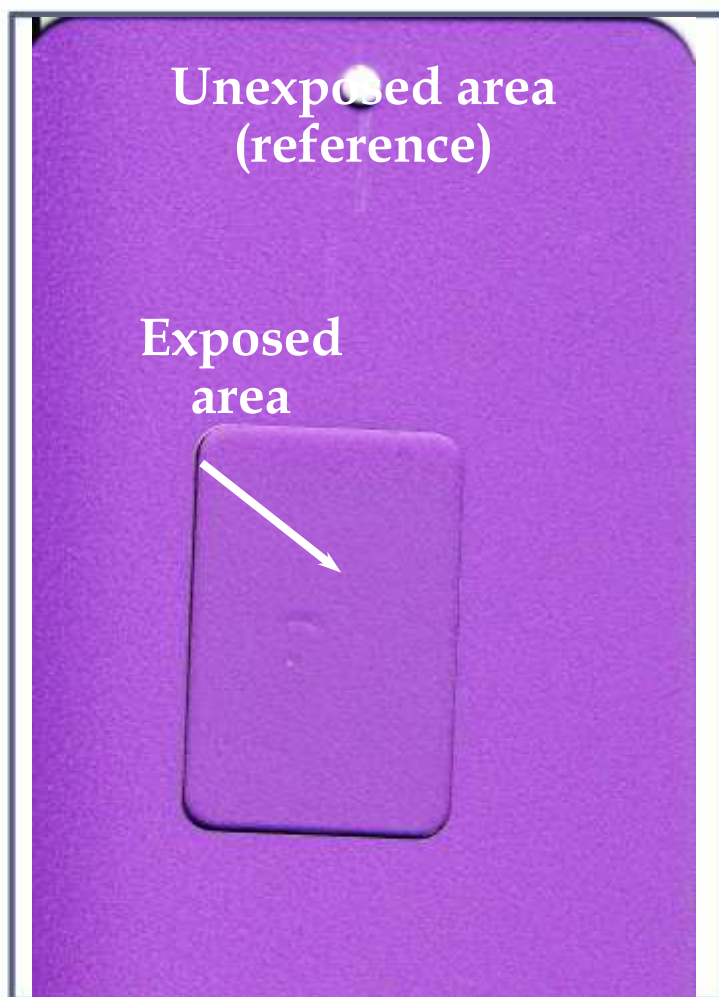
No. 354



**Device:
QSun 3000**



**Total duration:
1016h**



LAB. ID NUMBER: 28195
POWDER COATING: icetouch-022
HEAT TRANSFER FILM: --
Colour variation (ΔE): **2,34**
residual gloss: **81%**

Technical Remarks

Excellent residual gloss and very low colour variation (ΔE), after 1016 hours on sample. (\pm RAL 4005)

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**

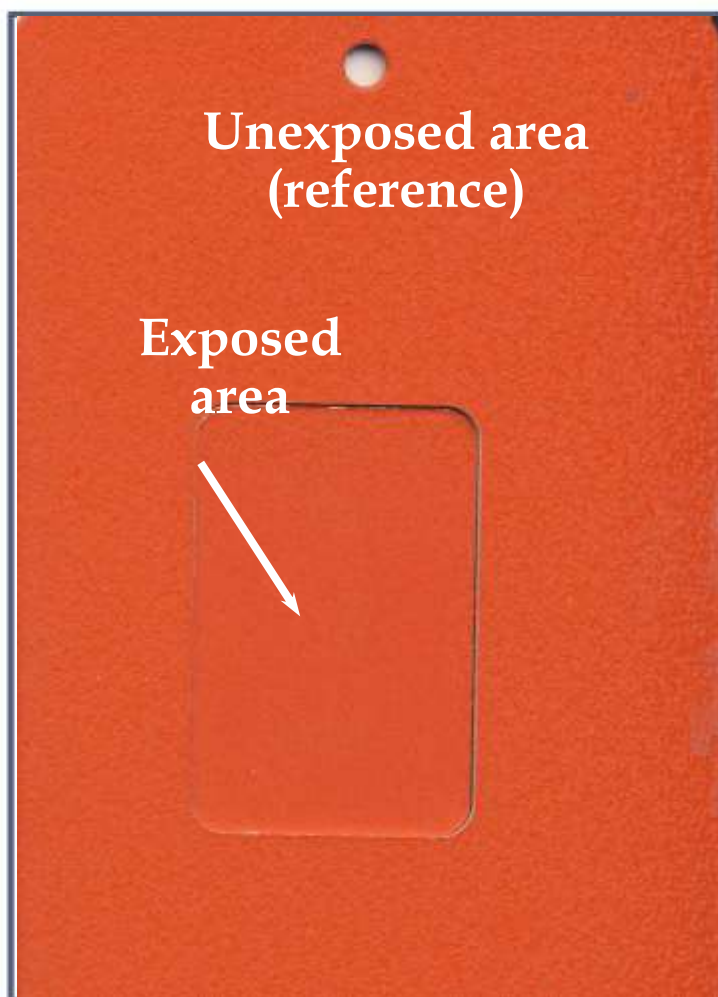
No. 373



**Device:
QSun 3000**



**Total duration:
1258h**



LAB. ID NUMBER: 30176
POWDER COATING: icetouch-009
HEAT TRANSFER FILM: --
Colour variation(ΔE):1,7
residual gloss: **68%**

Technical Remarks

Good residual gloss and very low colour variation (ΔE), after 1258 hours on sample.
(\pm RAL 2002)

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**

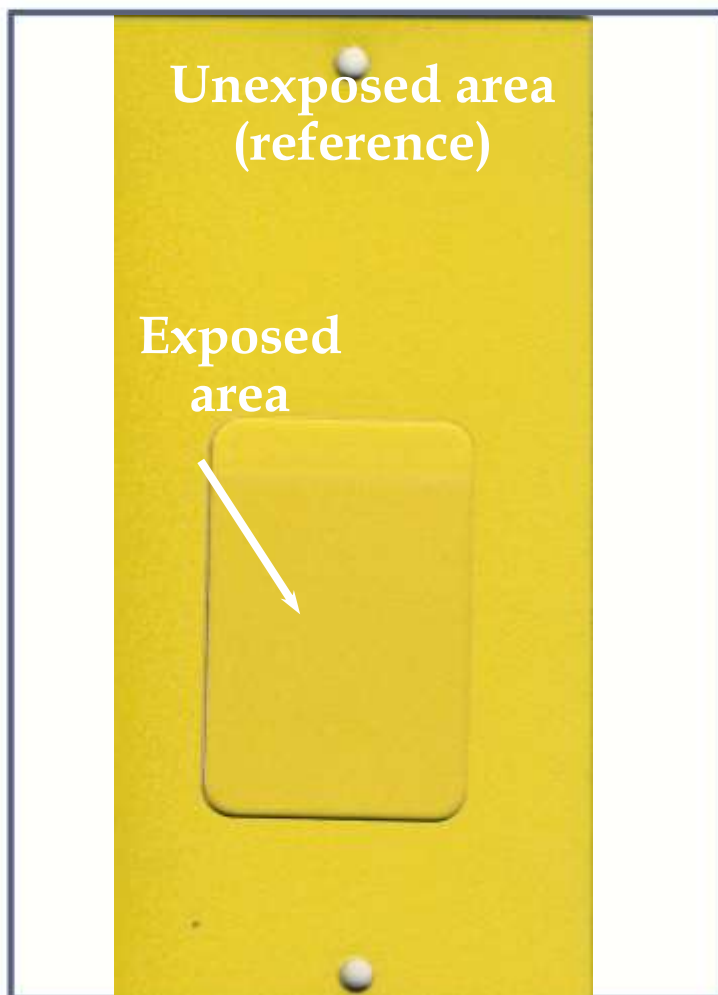
No. 371



**Device:
Solar 3000RHN**



**Total duration:
1277h**



LAB. ID NUMBER: 29715
POWDER COATING: icetouch-007
HEAT TRANSFER FILM: --
Colour variation(ΔE): **1,73**
residual gloss: **82%**

Technical Remarks

Excellent residual gloss and very low colour variation (ΔE), after 1277 hours on sample. (\pm RAL 1006)

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**

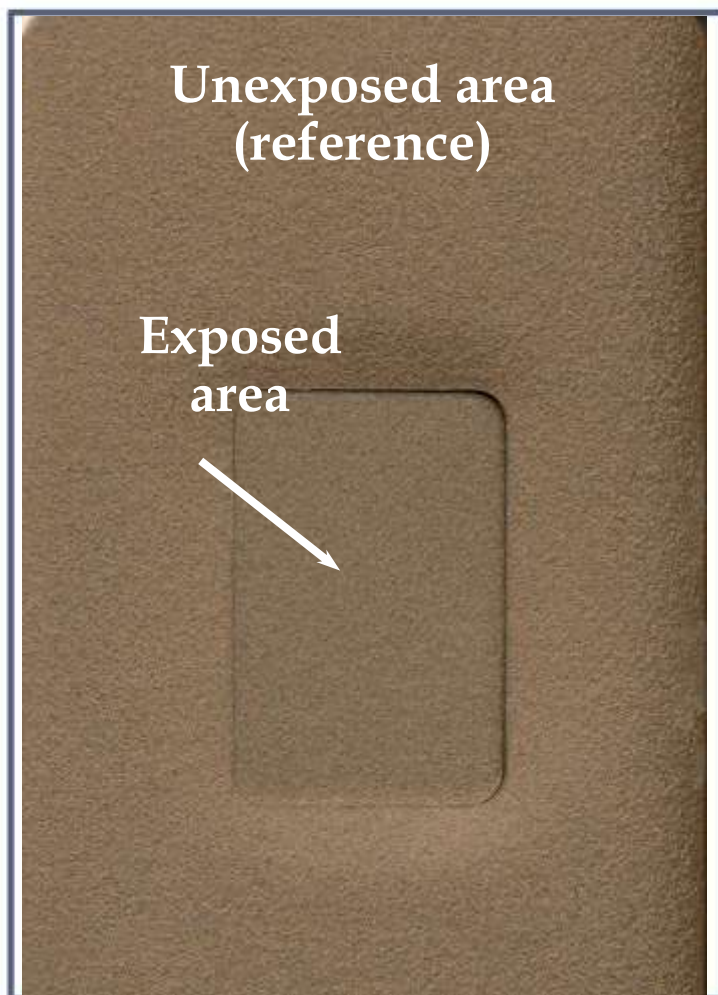
No. 376



**Device:
QSun 3000**



**Total duration:
1185h**



LAB. ID NUMBER: 30213
POWDER COATING: icetouch-014
HEAT TRANSFER FILM: --
Grey scale: 4
residual gloss: 83%

Technical Remarks

Excellent residual gloss and very low colour variation , after 1185 hours on 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**

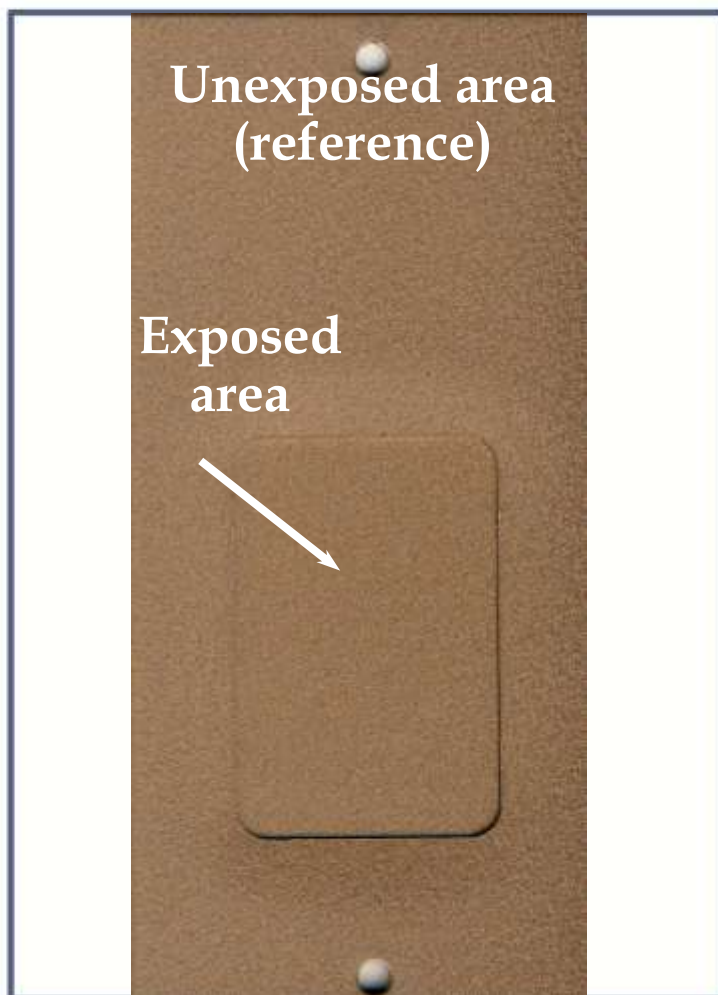
No. 376



**Device:
QSun 3000**



**Total duration:
1185h**



LAB. ID NUMBER: 30214
POWDER COATING: icetouch-015
HEAT TRANSFER FILM: --
Grey scale: **5/4**
residual gloss: **77%**

Technical Remarks

Excellent residual gloss and very low colour variation , after 1185 hours on 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**

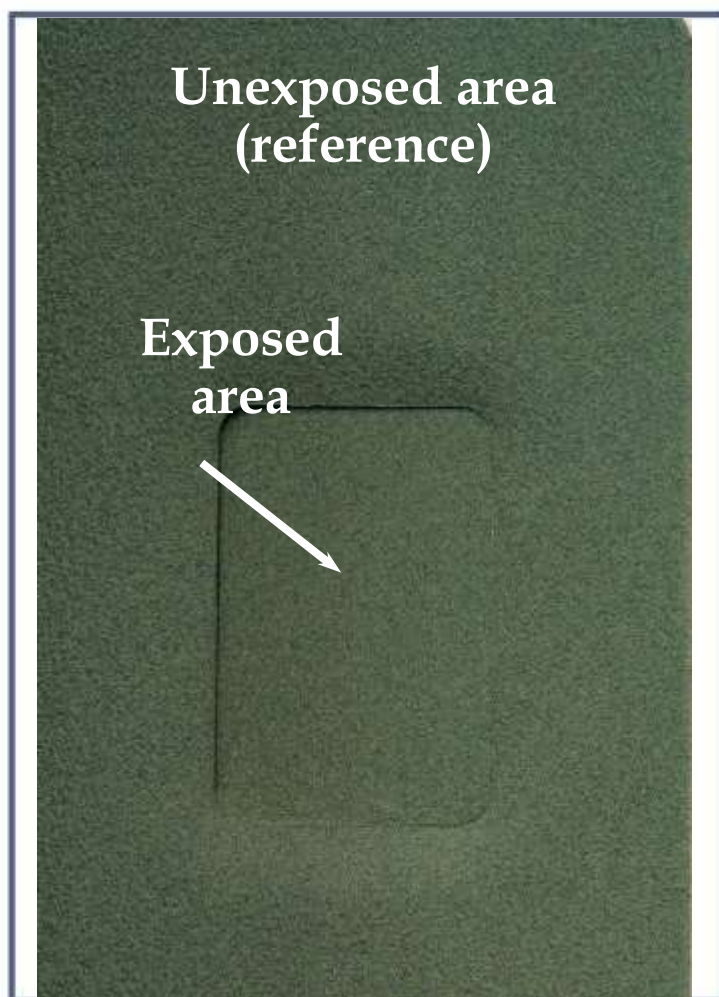
No. 376



**Device:
QSun 3000**



**Total duration:
1185h**



LAB. ID NUMBER: 30215
POWDER COATING: icetouch-016
HEAT TRANSFER FILM: --
Grey scale: **5/4**
residual gloss: **82%**

Technical Remarks

Excellent residual gloss and very low colour variation , after 1185 hours on 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**

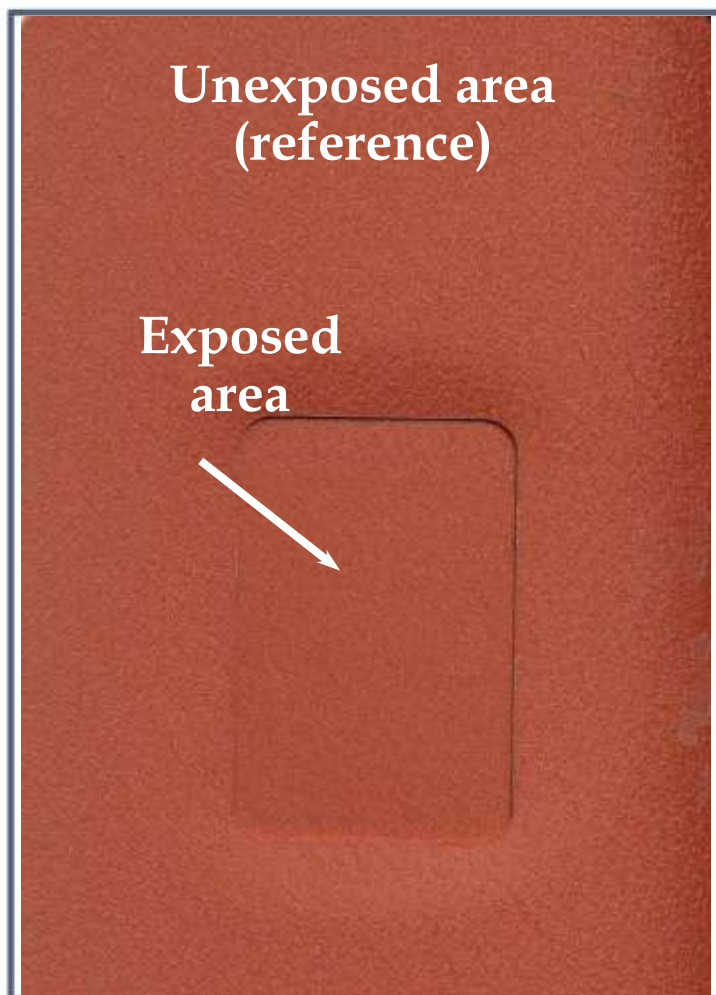
No. 376



**Device:
QSun 3000**



**Total duration:
1185h**



LAB. ID NUMBER: 30216
POWDER COATING: icetouch-017
HEAT TRANSFER FILM: --
Grey scale: **5/4**
residual gloss: **71%**

Technical Remarks

Excellent residual gloss and very low colour variation , after 1185 hours on 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**

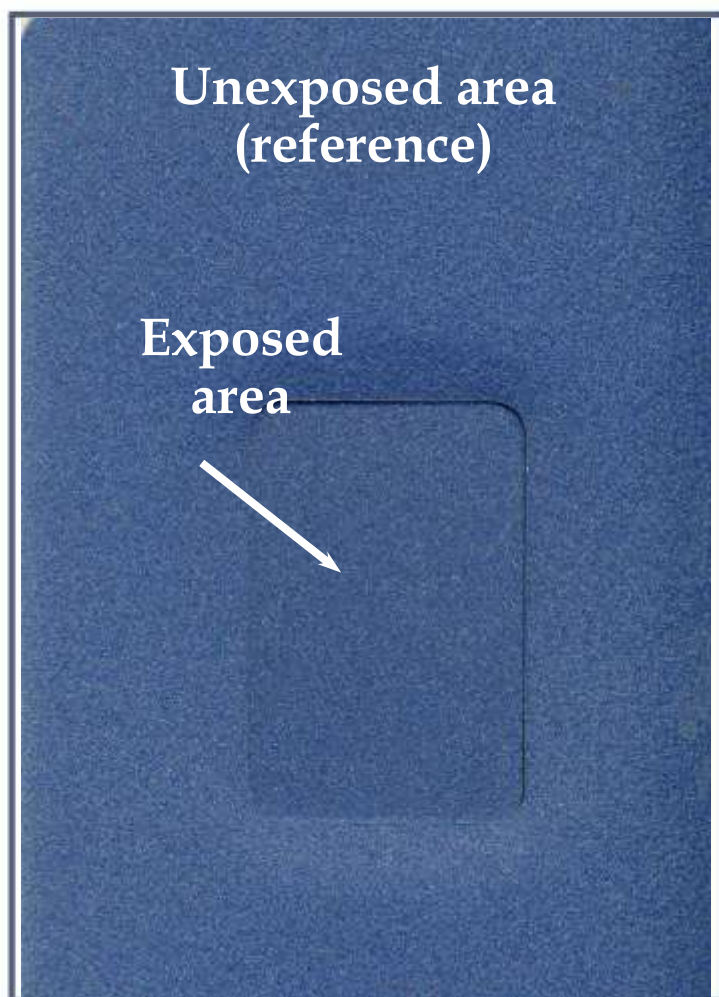
No. 376



**Device:
QSun 3000**



**Total duration:
1185h**



LAB. ID NUMBER: 30217
POWDER COATING: icetouch-018
HEAT TRANSFER FILM: --
Grey scale: **4**
residual gloss: **70%**

Technical Remarks

Good residual gloss and very low colour variation , after 1185 hours on 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**

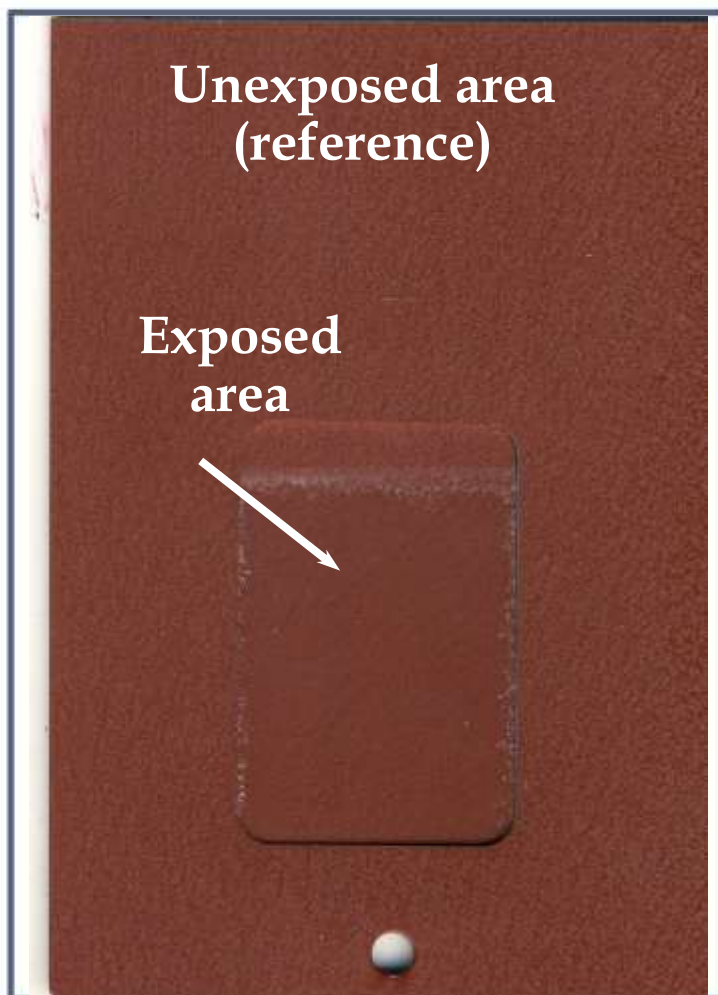
No. 460



**Device:
Sol 3000RH**



**Total duration:
1011h**



LAB. ID NUMBER: 38698
POWDER COATING: icetouch-033
HEAT TRANSFER FILM: --
Colour Variation (ΔE): **1,14**
residual gloss: **55%**

Technical Remarks

Sufficient residual gloss and very low colour variation (ΔE), after 1011 hours on sample. (\pm RAL 3009)

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**

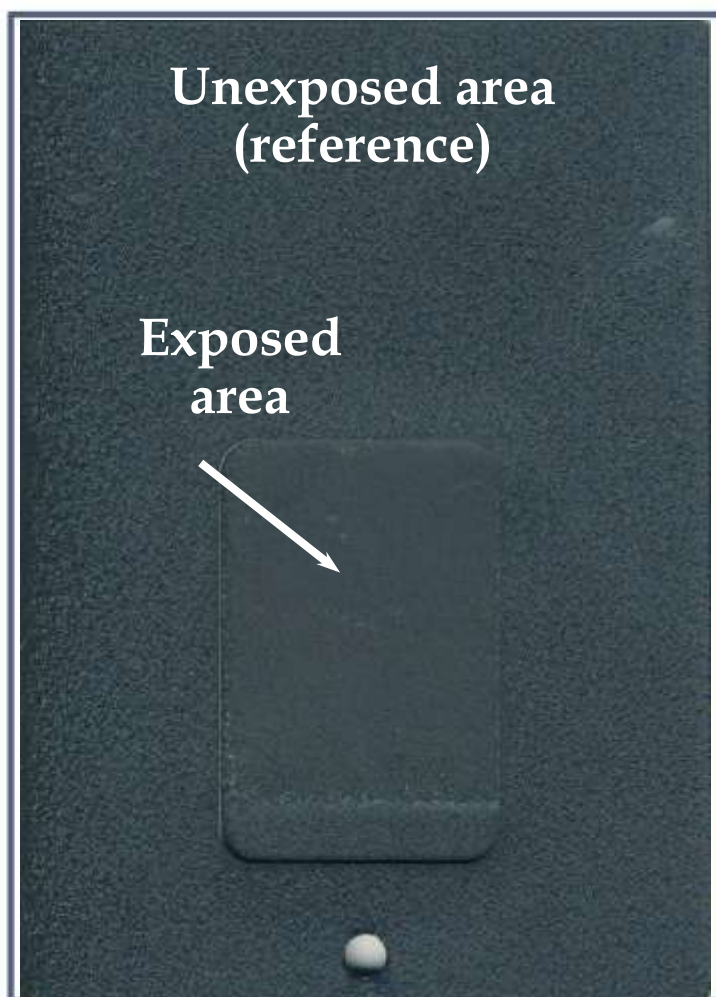
No. 460



**Device:
Sol 3000RH**



**Total duration:
1011h**



LAB. ID NUMBER: 38697
POWDER COATING: icetouch-034
HEAT TRANSFER FILM: --
Colour Variation (ΔE): **1,25**
residual gloss: **52%**

Technical Remarks

Sufficient residual gloss and very low colour variation (ΔE), after 1011 hours on sample. (\pm RAL 5008)

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**

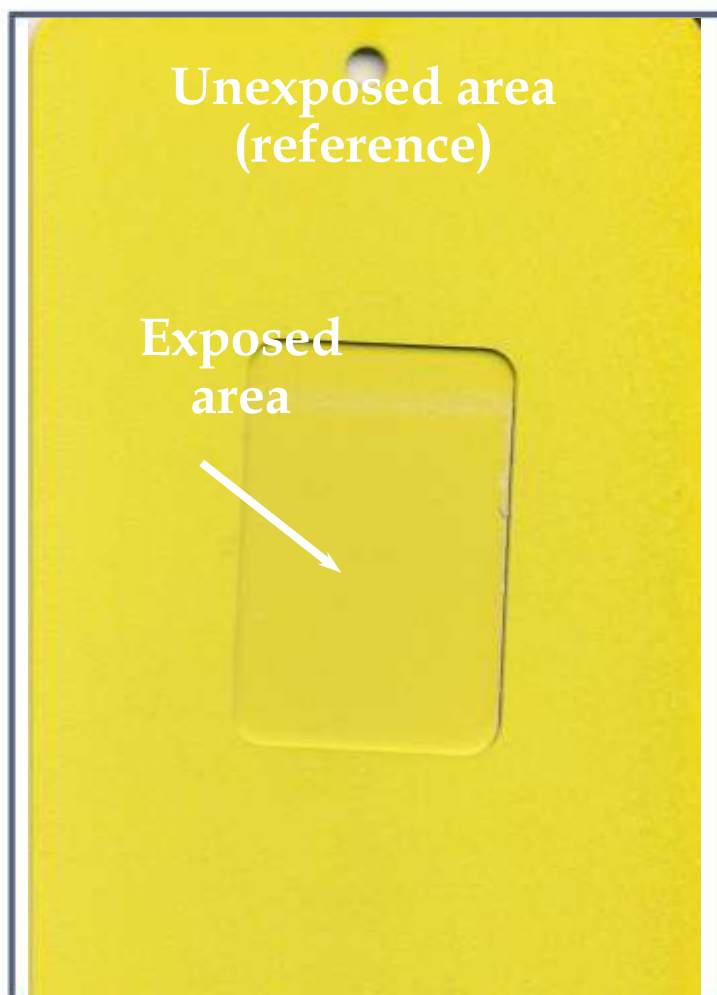
No. 464



**Device:
Sol 3000RHN**



**Total duration:
1102h**



LAB. ID NUMBER: 39977
POWDER COATING: icetouch-036
HEAT TRANSFER FILM: --
Colour Variation (ΔE): **2,02**
residual gloss: **56%**

Technical Remarks

Sufficient residual gloss and very low colour variation (ΔE), after 1102 hours on sample. (\pm RAL 1023)

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**

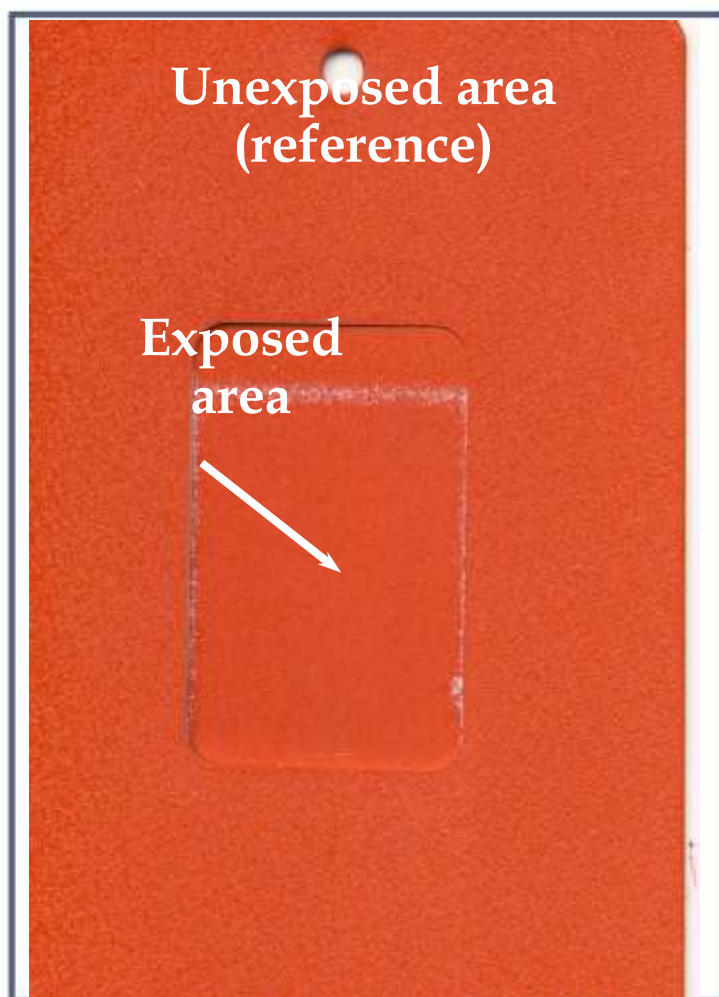
No. 464



**Device:
Sol 3000RHN**



**Total duration:
1102h**



LAB. ID NUMBER: 39978
POWDER COATING: icetouch-037
HEAT TRANSFER FILM: --
Colour Variation (ΔE): **2,08**
residual gloss: **61%**

Technical Remarks

Sufficient residual gloss and very low colour variation (ΔE), after 1102 hours on sample. (\pm RAL 3020)

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.



**Florida
Test**



**Total duration:
12 months**



EXPOSURE PERIOD:

FROM: 23/05/2014

TO: 27/05/2015

LAB. ID NUMBER: 34148
POWDER COATING: Icetouch-032
HEAT TRANSFER FILM: --
Grey scale: 4/5
residual gloss: 92%

Technical Remarks

Excellent residual gloss and low colour variation (ΔE).

Technical Opinion:

Suitable for OUTDOOR USE

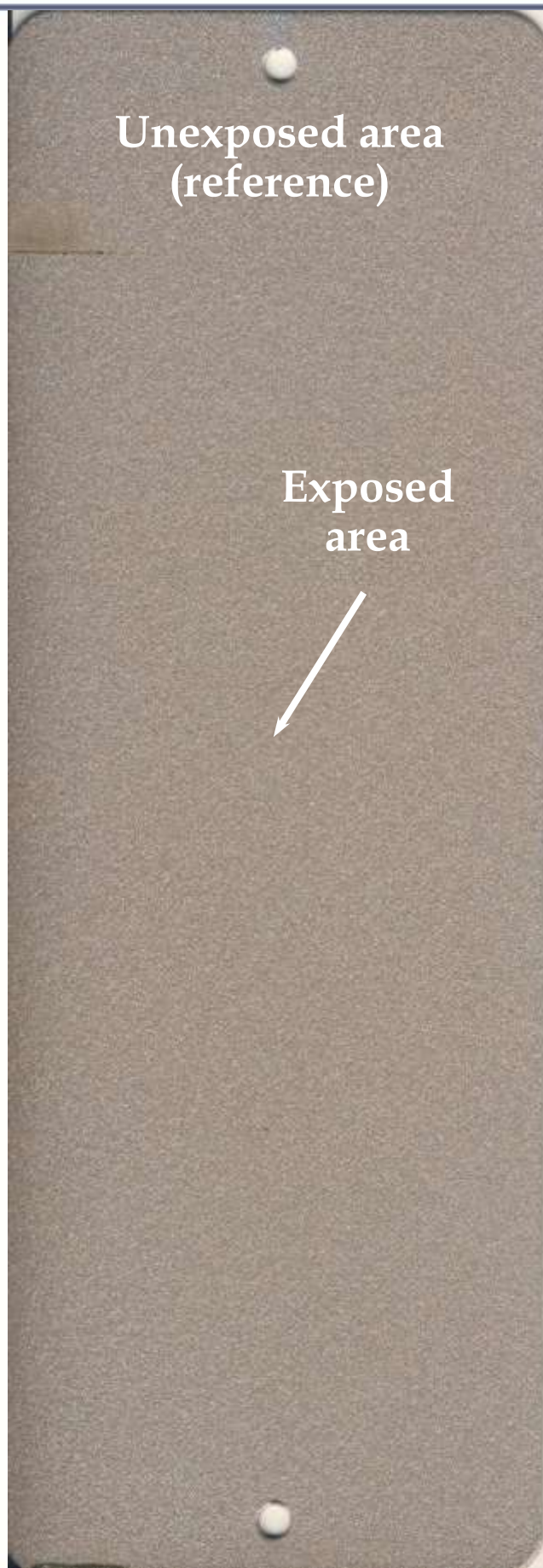
Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers.

QUALIDECO REQUIREMENTS

The residual gloss must be at least 50% of the original gloss.
The final evaluation will be based on visual inspection with the naked eye, with a maximum value of 4 on the grey scale (ISO 105-A02).

**Unexposed area
(reference)**

**Exposed
area**





**Florida
Test**



**Total duration:
12 months**



EXPOSURE PERIOD:

FROM: 03/04/2013

TO: 01/04/2014

LAB. ID NUMBER: 29542
POWDER COATING: Icetouch-001
HEAT TRANSFER FILM: --
Colour variation (ΔE): 1,28
residual gloss: 95%

Technical Remarks

Excellent residual gloss and low colour variation (ΔE)
(\pm RAL 9003)

Technical Opinion:

Suitable for OUTDOOR USE

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers.

QUALICOAT REQUIREMENTS

The residual gloss shall be at least 50% of the original gloss.
The ΔE values shall not exceed the maximum values prescribed in the annexed table (see Appendix A7 of Qualicoat Specifications).

**Unexposed area
(reference)**

**Exposed
area**





**Florida
Test**



**Total duration:
12 months**



EXPOSURE PERIOD:

FROM: 03/04/2013

TO: 01/04/2014

LAB. ID NUMBER: 29543
POWDER COATING: Icetouch-002
HEAT TRANSFER FILM: --
Colour variation (ΔE): **2,64**
residual gloss: **90%**

Technical Remarks

Excellent residual gloss and low colour variation (ΔE)
(\pm RAL 3020)

Technical Opinion:

Suitable for OUTDOOR USE

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers.

QUALICOAT REQUIREMENTS

The residual gloss shall be at least 50% of the original gloss.
The ΔE values shall not exceed the maximum values prescribed in the annexed table (see Appendix A7 of Qualicoat Specifications).

**Unexposed area
(reference)**

**Exposed
area**





**Florida
Test**



**Total duration:
12 months**



EXPOSURE PERIOD:

FROM: 03/04/2013

TO: 01/04/2014

LAB. ID NUMBER: 29544
POWDER COATING: Icetouch-003
HEAT TRANSFER FILM: --
Colour variation (ΔE): **2,66**
residual gloss: **80%**

Technical Remarks

Excellent residual gloss and low colour variation (ΔE)
(\pm RAL 5002)

Technical Opinion:

Suitable for OUTDOOR USE

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers.

QUALICOAT REQUIREMENTS

The residual gloss shall be at least 50% of the original gloss.
The ΔE values shall not exceed the maximum values prescribed in the annexed table (see Appendix A7 of Qualicoat Specifications).

**Unexposed area
(reference)**

**Exposed
area**





**Florida
Test**



**Total duration:
12 months**



EXPOSURE PERIOD:

FROM: 03/04/2013

TO: 01/04/2014

LAB. ID NUMBER: 29545
POWDER COATING: Icetouch-004
HEAT TRANSFER FILM: --
Colour variation (ΔE): 1,59
residual gloss: 79%

Technical Remarks

Excellent residual gloss and low colour variation (ΔE)
(\pm RAL 5018)

Technical Opinion:

Suitable for OUTDOOR USE

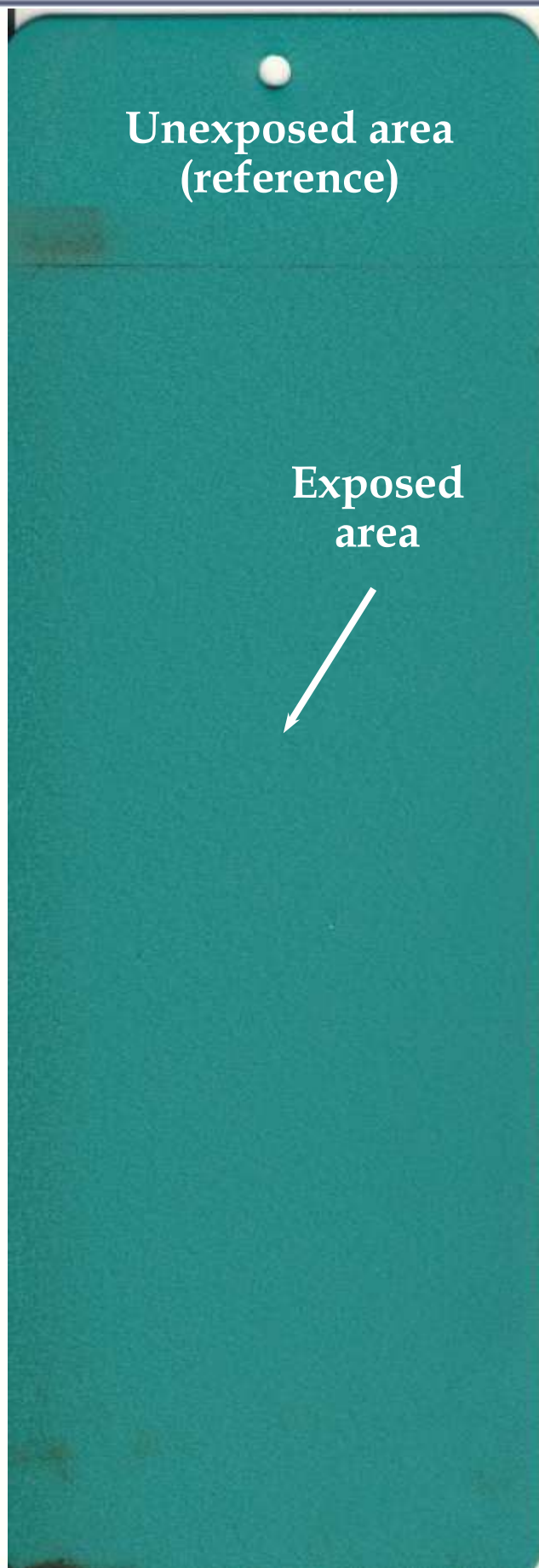
Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers.

QUALICOAT REQUIREMENTS

The residual gloss shall be at least 50% of the original gloss.
The ΔE values shall not exceed the maximum values prescribed in the annexed table (see Appendix A7 of Qualicoat Specifications).

**Unexposed area
(reference)**

**Exposed
area**





**Florida
Test**



**Total duration:
12 months**



EXPOSURE PERIOD:

FROM: 03/04/2013

TO: 01/04/2014

LAB. ID NUMBER: 29546
POWDER COATING: Icetouch-005
HEAT TRANSFER FILM: --
Colour variation (ΔE): 0,71
residual gloss: 83%

Technical Remarks

Excellent residual gloss and low colour variation (ΔE)
(\pm RAL 6019)

Technical Opinion:

Suitable for OUTDOOR USE

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers.

QUALICOAT REQUIREMENTS

The residual gloss shall be at least 50% of the original gloss.
The ΔE values shall not exceed the maximum values prescribed in the annexed table (see Appendix A7 of Qualicoat Specifications).

**Unexposed area
(reference)**

**Exposed
area**





**Florida
Test**



**Total duration:
12 months**



EXPOSURE PERIOD:

FROM: 03/04/2013

TO: 01/04/2014

LAB. ID NUMBER: 29547
POWDER COATING: Icetouch-006
HEAT TRANSFER FILM: --
Colour variation (ΔE): 0,81
residual gloss: 82%

Technical Remarks

Excellent residual gloss and low colour variation (ΔE)
(\pm RAL 5012)

Technical Opinion:

Suitable for OUTDOOR USE

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers.

QUALICOAT REQUIREMENTS

The residual gloss shall be at least 50% of the original gloss.
The ΔE values shall not exceed the maximum values prescribed in the annexed table (see Appendix A7 of Qualicoat Specifications).

**Unexposed area
(reference)**

**Exposed
area**





**Florida
Test**



**Total duration:
12 months**



EXPOSURE PERIOD:

FROM: 03/04/2013

TO: 01/04/2014

LAB. ID NUMBER: 29548
POWDER COATING: Icetouch-008
HEAT TRANSFER FILM: --
Colour variation (ΔE): **1,36**
residual gloss: **71%**

Technical Remarks

Excellent residual gloss and low colour variation (ΔE)
(\pm RAL 9005)

Technical Opinion:

Suitable for OUTDOOR USE

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers.

QUALICOAT REQUIREMENTS

The residual gloss shall be at least 50% of the original gloss.
The ΔE values shall not exceed the maximum values prescribed in the annexed table (see Appendix A7 of Qualicoat Specifications).

**Unexposed area
(reference)**

**Exposed
area**





**Florida
Test**



**Total duration:
12 months**



EXPOSURE PERIOD:

FROM: 03/04/2013

TO: 01/04/2014

LAB. ID NUMBER: 29549
POWDER COATING: Icetouch-011
HEAT TRANSFER FILM: --
Grey scale: 4
residual gloss: 79%

Technical Remarks

Excellent residual gloss and low colour variation (ΔE).

Technical Opinion:

Suitable for OUTDOOR USE

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers.

QUALIDECO REQUIREMENTS

The residual gloss must be at least 50% of the original gloss.
The final evaluation will be based on visual inspection with the naked eye, with a maximum value of 4 on the grey scale (ISO 105-A02).

**Unexposed area
(reference)**

**Exposed
area**





**Florida
Test**



**Total duration:
12 months**



EXPOSURE PERIOD:

FROM: 03/04/2013

TO: 01/04/2014

LAB. ID NUMBER: 29550
POWDER COATING: Icetouch-012
HEAT TRANSFER FILM: --
Grey scale: 5/4
residual gloss: 70%

Technical Remarks

Good residual gloss and low colour variation (ΔE).

Technical Opinion:

Suitable for OUTDOOR USE

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers.

QUALIDECO REQUIREMENTS

The residual gloss must be at least 50% of the original gloss.
The final evaluation will be based on visual inspection with the naked eye, with a maximum value of 4 on the grey scale (ISO 105-A02).

**Unexposed area
(reference)**

**Exposed
area**





**Florida
Test**



**Total duration:
12 months**



EXPOSURE PERIOD:

FROM: 03/04/2013

TO: 01/04/2014

LAB. ID NUMBER: 29551
POWDER COATING: Icetouch-013
HEAT TRANSFER FILM: --
Grey scale: 4
residual gloss: 88%

Technical Remarks

Excellent residual gloss and low colour variation (ΔE).

Technical Opinion:

Suitable for OUTDOOR USE

Test was carried on samples prepared according to technical specifications supplied by raw materials manufacturers.

QUALIDECO REQUIREMENTS

The residual gloss must be at least 50% of the original gloss.
The final evaluation will be based on visual inspection with the naked eye, with a maximum value of 4 on the grey scale (ISO 105-A02).

**Unexposed area
(reference)**

**Exposed
area**

