TECHNICAL TOOLS

*Laboratory Tests and Technical Documentation*

MRK-012-0065R5

# *SERIES 11X-XXX-YYYY*
# *(DS-0XXXA)*

Anti-Graffiti Powder Coatings

*Information:*

1. *Product features*
2. *Technical information*
3. *Variants and special formulations*
4. *Possible usage and applications*
5. *Anti-graffiti test*
6. *Anti-graffiti test on coloured powders*
7. *Resistance to chemicals*

# SERIES 11X-XXX-YYYY

Anti-graffiti Powder Coatings

## 1. Product features

The Anti-graffiti coating powders Serie *11X-XXX-YYYY* (previous code: DS-*0XXXA*) feature a high resistance to grime and stains. Thanks to their special formulation, the products coated with this powders are protected from permanent inks, which on standard powders would leave marks or halos even after cleaning with specific detergents: Anti-graffiti powder coatings make instead writings removal very easy.

All these powders are suitable for sublimation and have typically a smooth, glossy surface.

## 2. Technical information

- Technical data

| | |
|---|---|
| Powder type | Polyurethane |
| Resistance class | Class 1 |
| Yield (in surface/mass) | 13,1 $m^2$/Kg |
| Specific weight | 1,27 ± 0,03 g/$cm^3$ |

- Application methods and curing conditions

Powder available for corona charging application.
Curing time and temperature: 20 minutes at 200°C – 392°F (metal temperature).
Reccomended thickness: 60 microns – yield 13.1 $m^2$/Kg,
70 microns – yield 11.2 $m^2$/Kg,
80 microns – yield 9.8 $m^2$/Kg.

- Mechanical properties and durability

| *Test* | *Standard Reference* | *Result* |
|---|---|---|
| Buchholz | ISO 2815 | ok |
| Adhesion | ISO 2409 | No adhesion loss; ok |
| Acetic Salt Spray | ISO 9227 | corrosion<4 mm; ok |

**3. Available options:**

- Transparent or matt colored surface;
- Super durable (Class 2);
- Low curing;
- Antimicrobial.

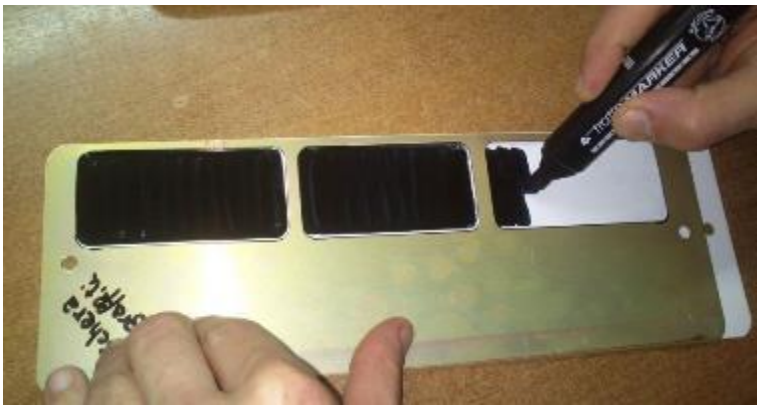
**4. Fields of application**

The Anti-graffiti series *(11X-XXX-YYYY)* provides a reliable solution for surfaces subject to soiling (street furniture, public spaces, etc.), but also for objects which are more likely to get ink stains during their usage, as worktops, tabletops, and so on. Thanks to anti-graffiti powders it is possible to easily remove unpleasant marks and keep surfaces clean.

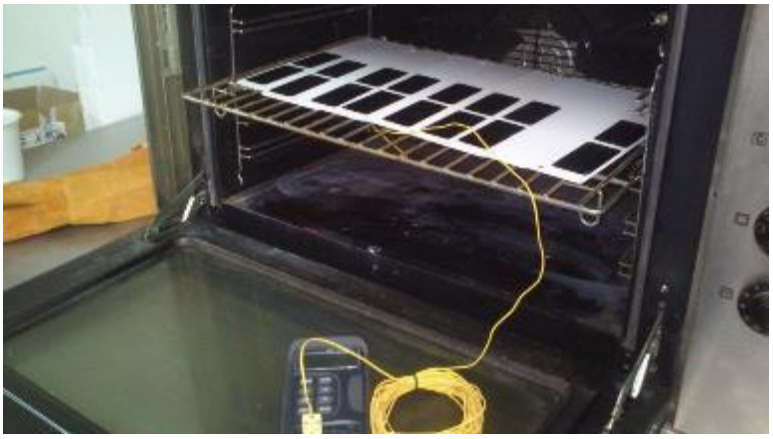
**5. Anti-graffiti test**

The anti-graffiti properties of this series are tested according to the international standard ***UNI 11246***, which establishes the methods and the procedures to determine the resistance to soiling.

Here below some of the steps outlined by the standard:



Soiling



Drying of the staining agents

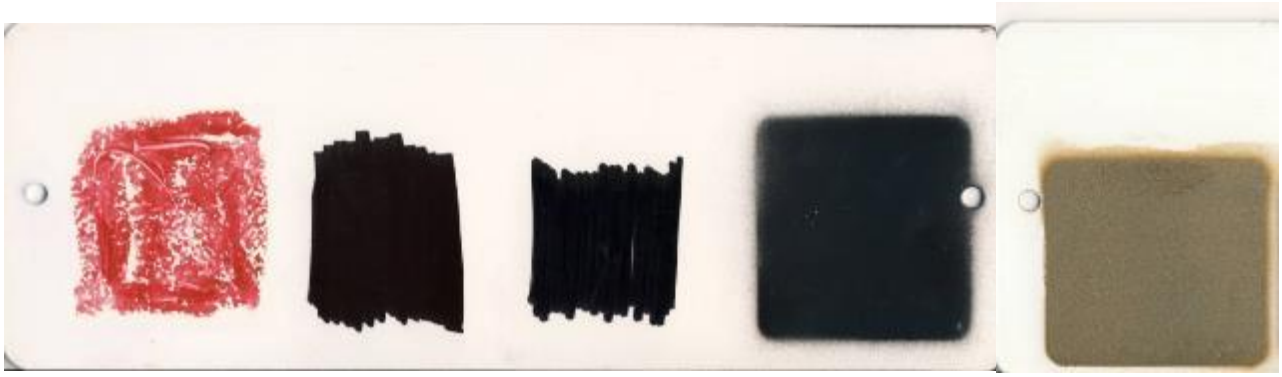
Cleaning

# SERIES 11X-XXX-YYYY

Anti-graffiti Powder Coatings

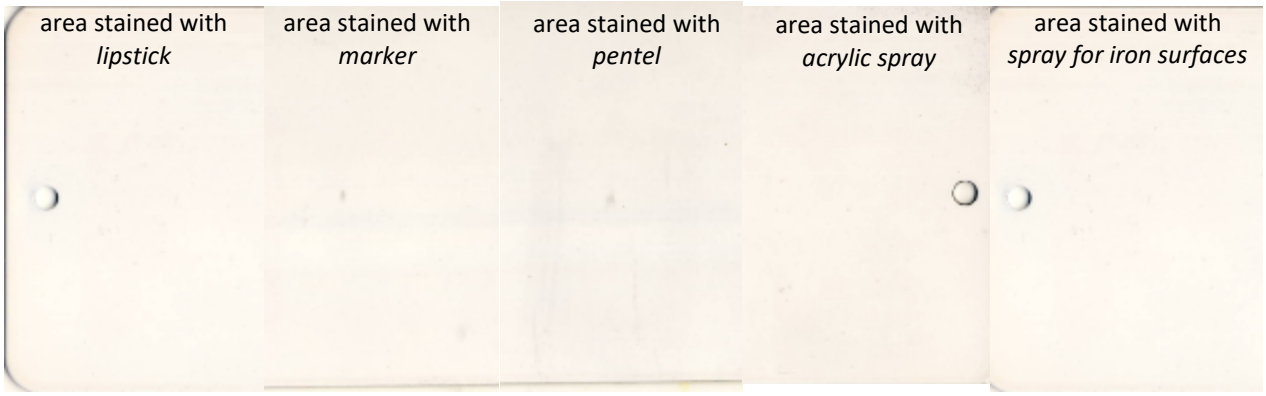
The test was performed by removing staining agents with the most suitable cleaning product.

Anti-graffiti DS-0810SA (top coat on white base)
soiled with the tested staining agents



| ***LIPSTICK*** | ***MARKER permanent ink*** | ***N50 PENTEL permanent ink*** | ***SPRAY acrylic*** | ***SPRAY for ferrous surfaces*** |
|---|---|---|---|---|

After the removal of staining agents with different types of cleaning products




| **Excellent cleaning results with ethyl alcohol and with etasol/MEK*** | **Excellent cleaning results with etasol/MEK*** | **Excellent cleaning results with etasol/MEK*** | **Excellent cleaning results with ethyl alcohol** | **Excellent cleaning results with etasol/MEK** |
|---|---|---|---|---|

***mix 70:30 of etasol:methylethylketone**

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Anti-graffiti Powder Coatings

Effectiveness of the cleaning products depending on the tested staining agents

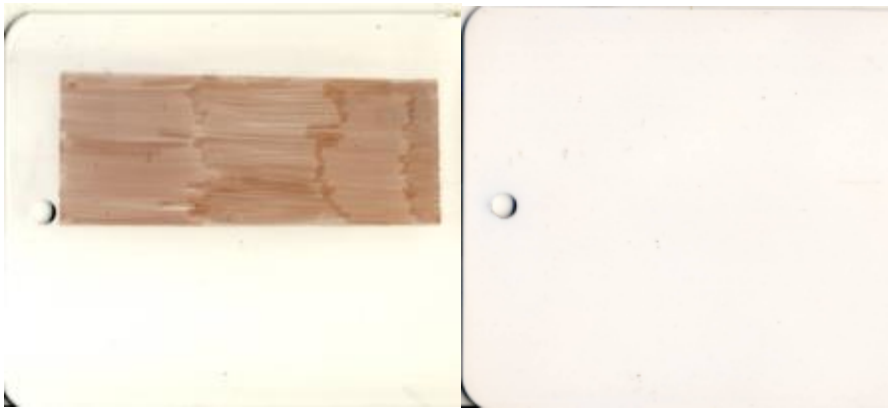
***DS-0810SA (top coat on white base PE411)***

| CLEANING PRODUCTS | STAINING AGENTS | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| | ***LIPSTICK*** | ***MARKER permanent black marker*** | ***N50 PENTEL permanent black marker*** | ***SPRAY Acrylic matt*** | ***SPRAY for ferrous surfaces*** |
| ***ETH. ALCOHOL*** | ***V*** | **X** | **X** | ***V*** | **X** |
| ***ETASOL/MEK*** | ***V*** | ***V*** | ***V*** | **X** | ***V*** |

***White polyester***

| CLEANING PRODUCTS | STAINING AGENTS | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| | ***LIPSTICK*** | ***MARKER permanent black marker*** | ***N50 PENTEL permanent black marker*** | ***SPRAY Acrylic matt*** | ***SPRAY for ferrous surfaces*** |
| ***ETH. ALCOHOL*** | **X** | **X** | **X** | **X** | **X** |
| ***ETASOL/MEK*** | **X** | **X** | **X** | **X** | **X** |

- Comparison between a standard powder coating and anti-graffiti



Standard polyester product
Stained with N50 Pentel and cleaned with etasol/MEK

Anti-graffiti DS-0810SA (top coat on white base PE411)
Stained with N50 Pentel and cleaned with etasol/MEK after 10 staining/cleaning cycles
**ΔE: 0,96; Residual gloss:100%**

**6. Anti-graffiti test with colored powders**

The anti-graffiti properties of the standard Dalì powder were compared with the "*anti-graffiti*" variant specifically formulated, by soiling two sample panels painted respectively with PE 411 + Dalì-001 and PE 411 + Dalì-001 "*Anti-graffiti*" with several staining agents. This test included the following stages:

- Soiling with: lipstick, marker, N50 pentel, black acrylic spray;
- Drying of staining agents in an oven at 80°C (176°F) for 120';
- Conditioning, at 23°C (73.4°F), for at least 120' with 50% relative humidity;
- Removal of staining agents with commercial ethylic alcohol;
- Removal of staining agents with a mixture of etasol/MEK 70:30.

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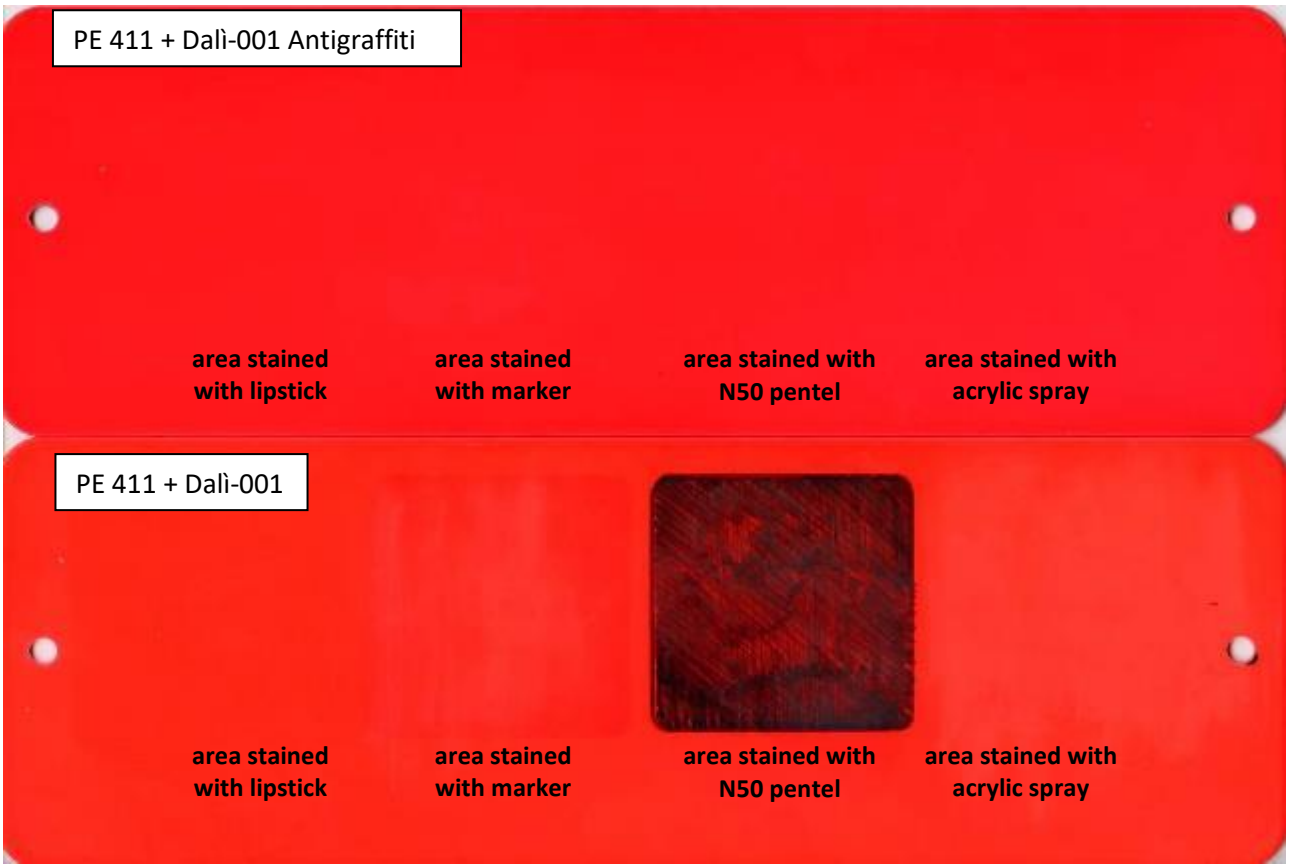
- Comparative test between sample panels painted with PE 411 + Dalì-001 and PE 411 + Dalì-001 Antigraffiti




**CONCLUSION**

As shown in the picture above, after the cleaning with commercial alcohol and then with a mixture of etasol/MEK 70:30, the sample coated with PE 411 + Dalì-001 still has traces of staining agents (*pentel N50*) and marks on the surface previously stained. Instead, the sample coated with PE 411 + Dalì-001 *Anti-graffiti* has kept its initial aspect.

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Anti-graffiti Powder Coatings

## Comparative test between sample panels painted with Materico-103 and Materico-108 and Materico-103 Antigraffiti and Materico-108 Antigraffiti

The powders of the "Materico" series have a particular highly texture surface, which is harder to clean. We have decided to test the anti-graffiti properties of the standard "Materico" powder compared with the "*anti-graffiti*" variant specifically formulated, by soiling two sample panels painted respectively with Materico-103 and Materico-108 and Materico-103 "*Anti-graffiti*" and Materico-108 *"Anti-graffiti"* with several staining agents. This test follow the following stages:

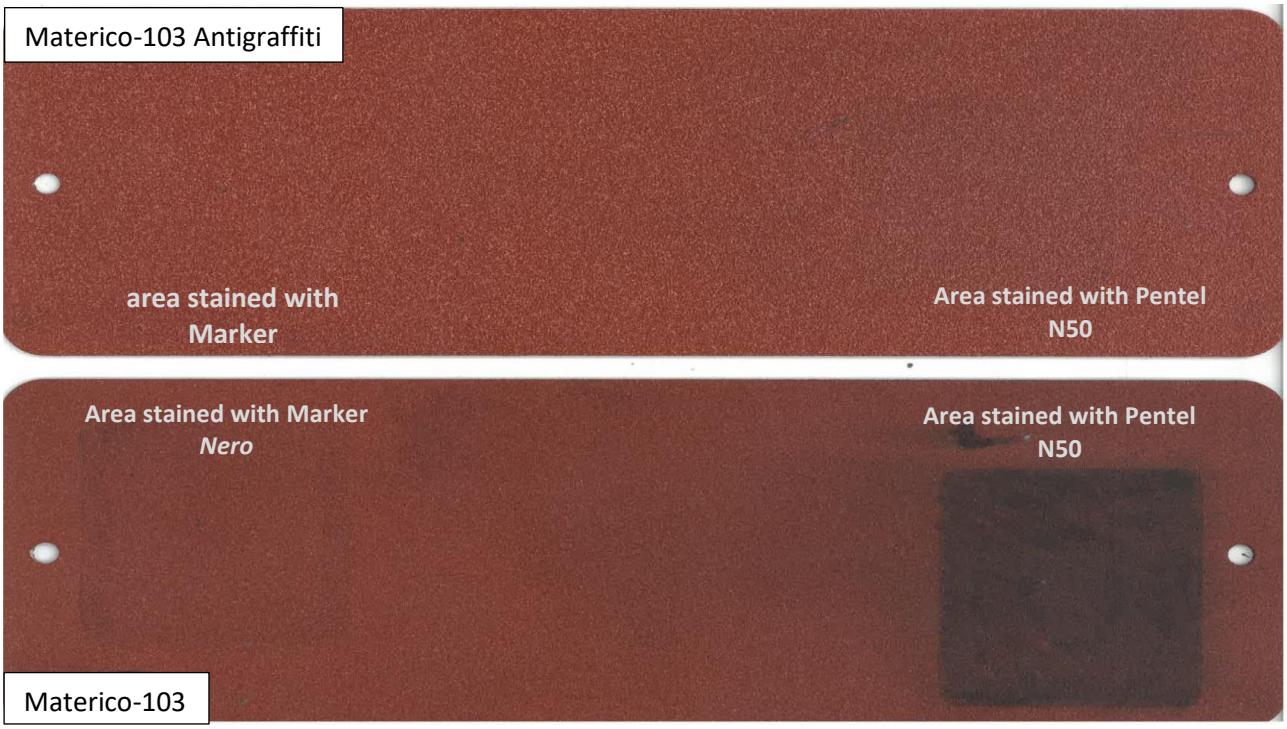
- Soiling with: marker, N50 pentel;

- Drying of staining agents in an oven at 80°C (176°F) for 120';

- Conditioning, at 23°C (73.4°F), for at least 120' with 50% relative humidity;

- Removal of staining agents with commercial ethylic alcohol;

- Removal of staining agents with a mixture of etasol/MEK 70:30.



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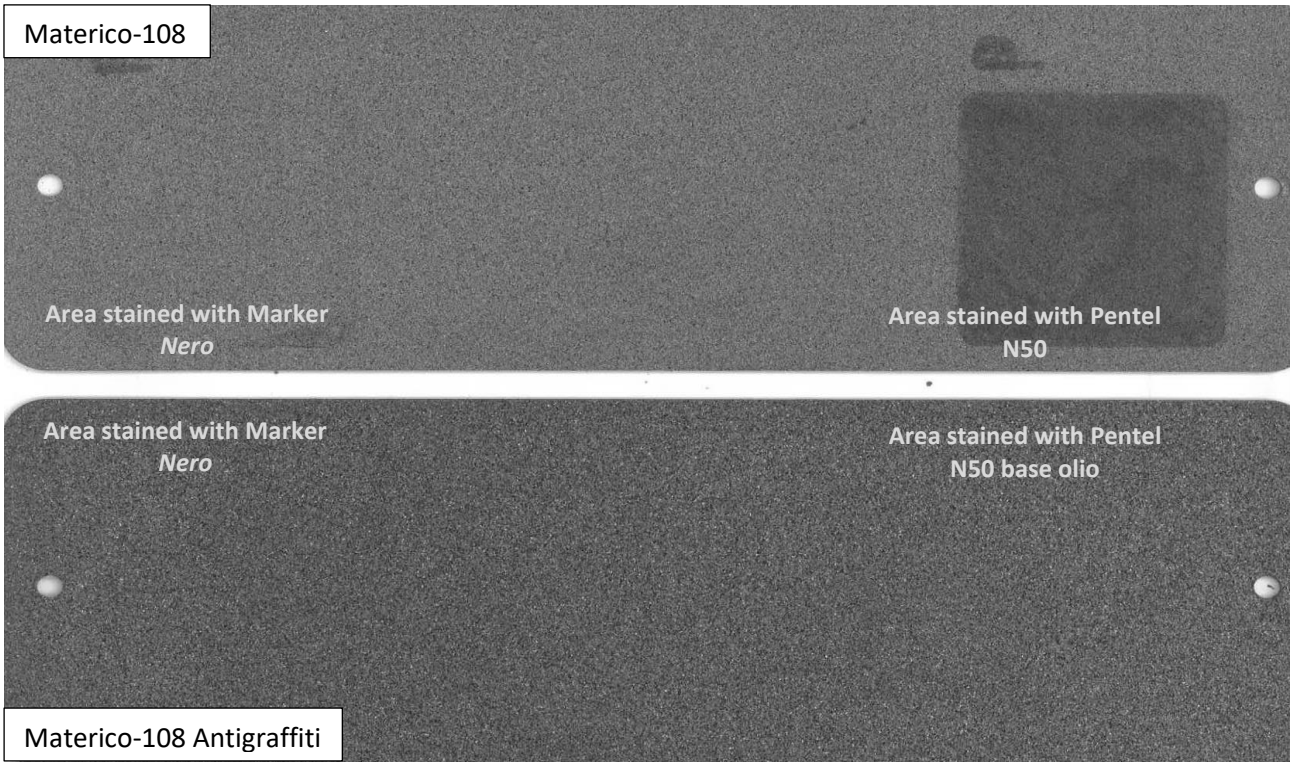
Anti-graffiti Powder Coatings



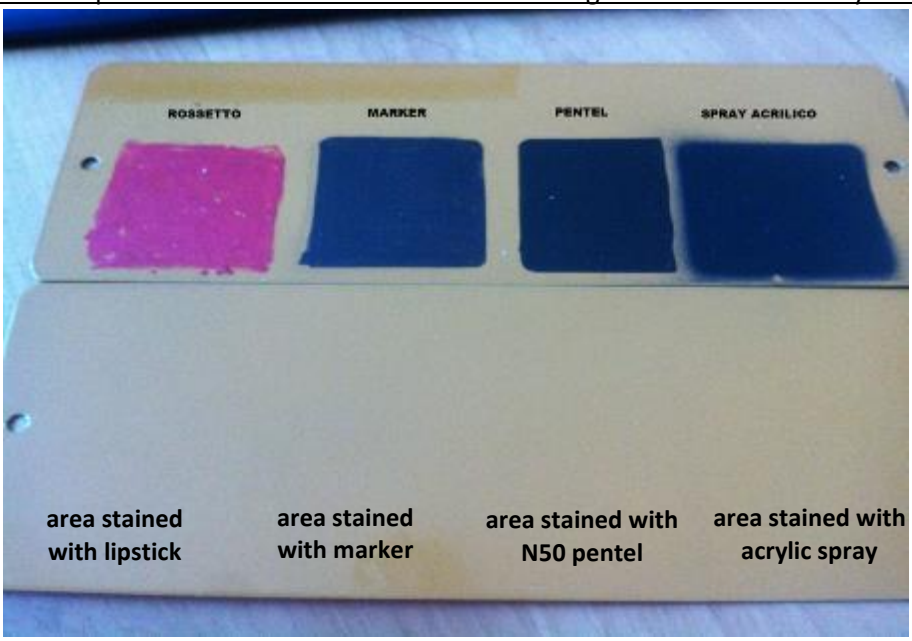

| CLEANING PRODUCTS | STAINING AGENTS | |
|---|---|---|
| |  |  |
| | ***MARKER permanent black marker*** | ***N50 PENTEL permanent black marker*** |
| ***ETH. ALCOHOL*** | ***V*** | ***X*** |
| ***ETASOL/MEK*** | ***V*** | ***V*** |
| | **Excellent cleaning results with ethyl alcohol** | **Excellent cleaning results with etasol/MEK*** |

The anti-graffiti properties were also tested by soiling some sample panels painted with DS-0821-SA (colored powder suitable for sublimation) and others painted with PU powder in RAL colour. This test included the following stages:

-Soiling with: lipstick, marker, N50 pentel, acrylic spray;
- Drying of staining agents in an oven at 80°C (176°F) for 120';
- Conditioning, at 23°C (73.4°F), for at least 120' with 50% relative humidity;
- Removal of staining agents with commercial ethylic alcohol;
- Removal of staining agents with a mixture of etasol/MEK 70:30.

**Test on DS-0821-SA**


ABOVE: Soiled panel painted with DS-0821SA.
BELOW: Panel painted with DS-0821SA after the cleaning with commercial ethylic alcohol.




ABOVE: Soiled panel painted with DS-0821SA.
BELOW: Panel painted with DS-0821SA after the cleaning with a mixture of etasol/MEK 70:30.

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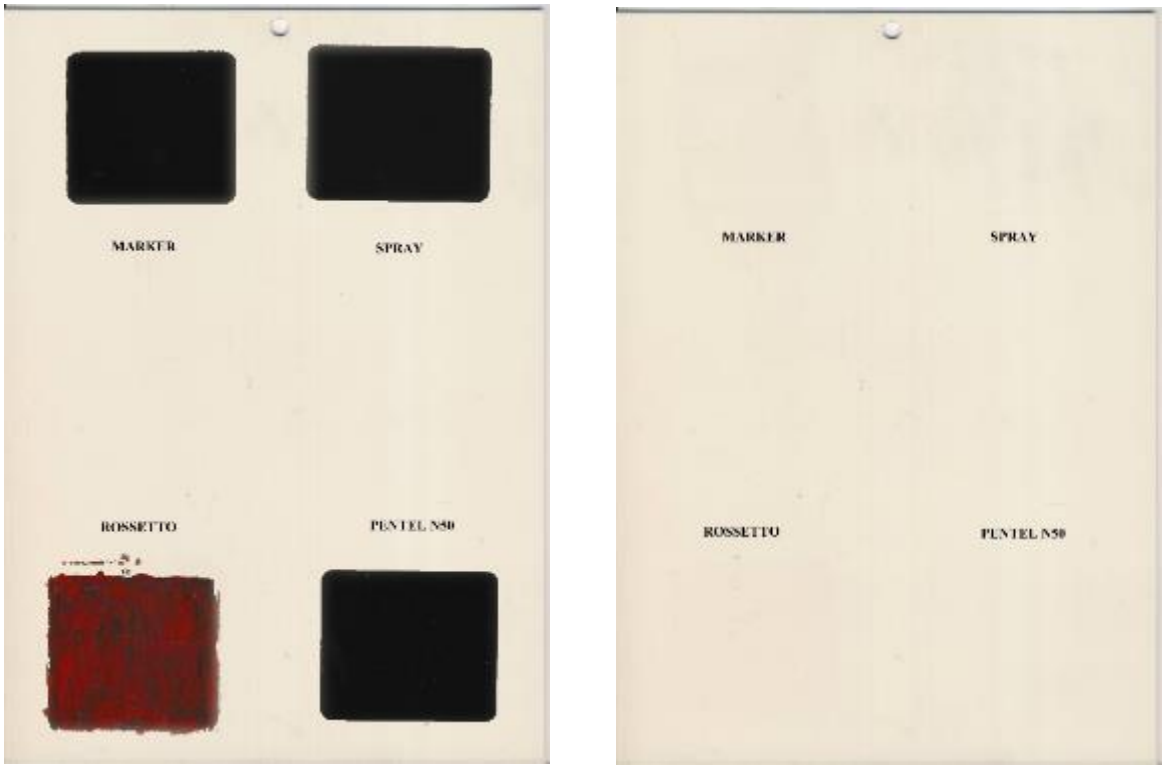
Anti-graffiti Powder Coatings

***Effectiveness of cleaning products depending on the staining agents tested on DS-0821SA***

| CLEANING PRODUCTS | STAINING AGENTS | | | |
|---|---|---|---|---|
| |  |  |  |  |
| | ***LIPSTICK*** | ***MARKER permanent black marker*** | ***N50 PENTEL permanent black marker*** | ***SPRAY Acrylic matt*** |
| ***ETH. ALCOHOL*** | ***V*** | ***V*** | **X** | ***V*** |
| ***ETASOL/MEK**** | ***V*** | ***V*** | ***V*** | ***V*** |
| | **Excellent cleaning results with ethylic alcohol** | **Excellent cleaning results with ethylic alcohol** | **Excellent cleaning results with etasol/MEK*** | **Excellent cleaning results with ethylic alcohol** |

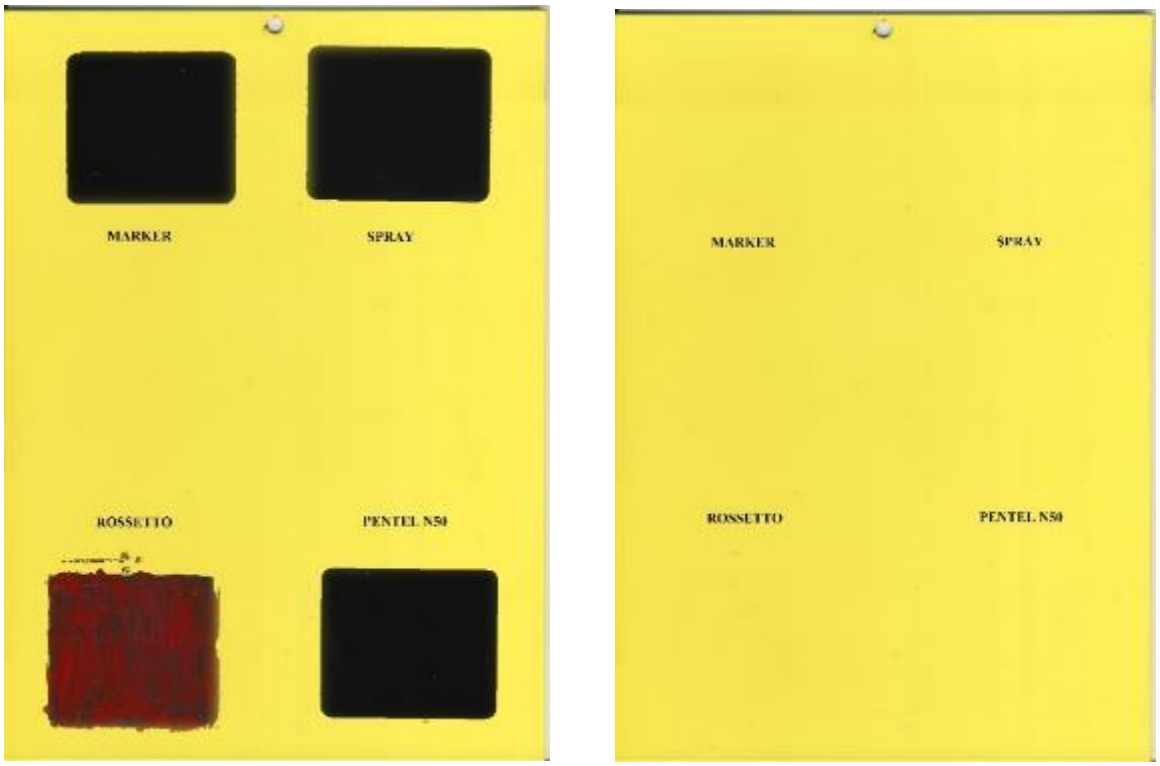
***mixture etasol:methylethylchetone 70:30**

**Test on a sample panel painted with 11B-089-A038 (PU Smooth Ivory Anti-graffiti "RAL 1013")**



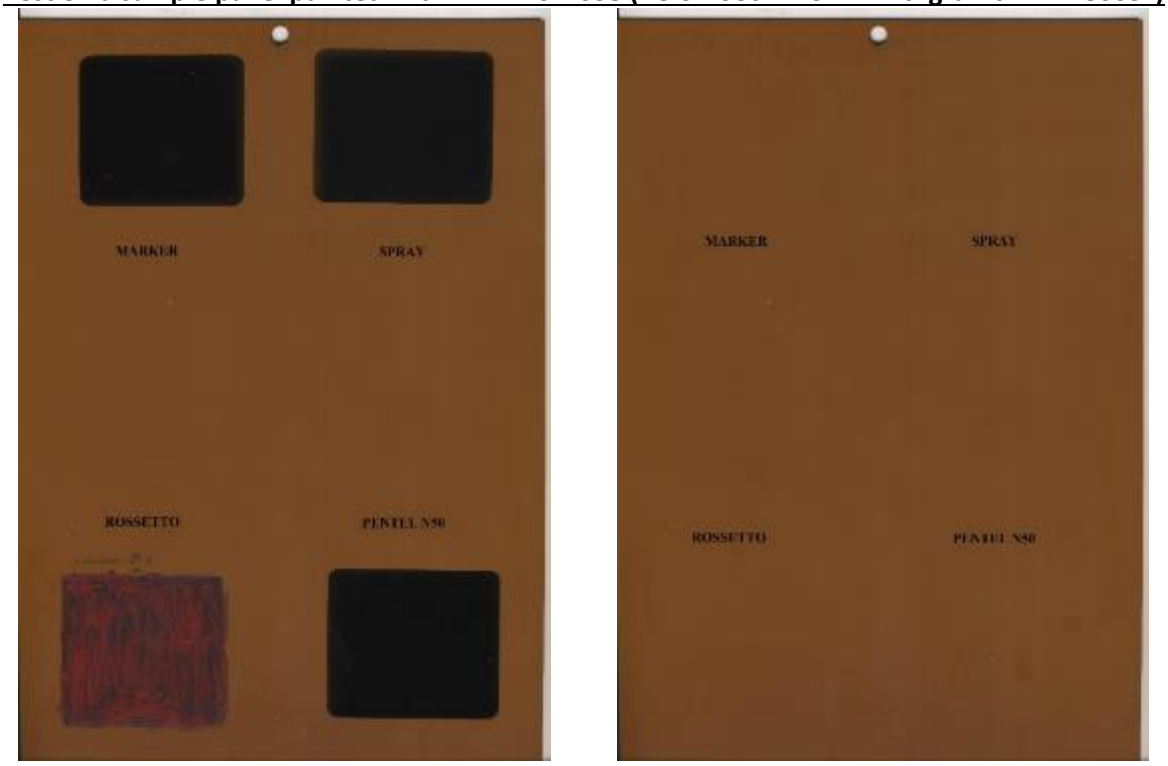

LEFT: Sample panel painted and soiled.
RIGHT: Painted sample panel after the cleaning with a mixture of etasol/MEK 70:30.

**Test on a sample panel painted with 11B-119-A038 (PU Smooth Yellow Anti-graffiti "RAL 1018")**




LEFT: Sample panel painted and soiled.
RIGHT: Painted sample panel after the cleaning with a mixture of etasol/MEK 70:30.

**Test on a sample panel painted with 11B-176-A038 (PU Smooth Brown Anti-graffiti "RAL 8003")**




LEFT: Sample panel painted and soiled.
RIGHT: Painted sample panel after the cleaning with a mixture of etasol/MEK 70:30.

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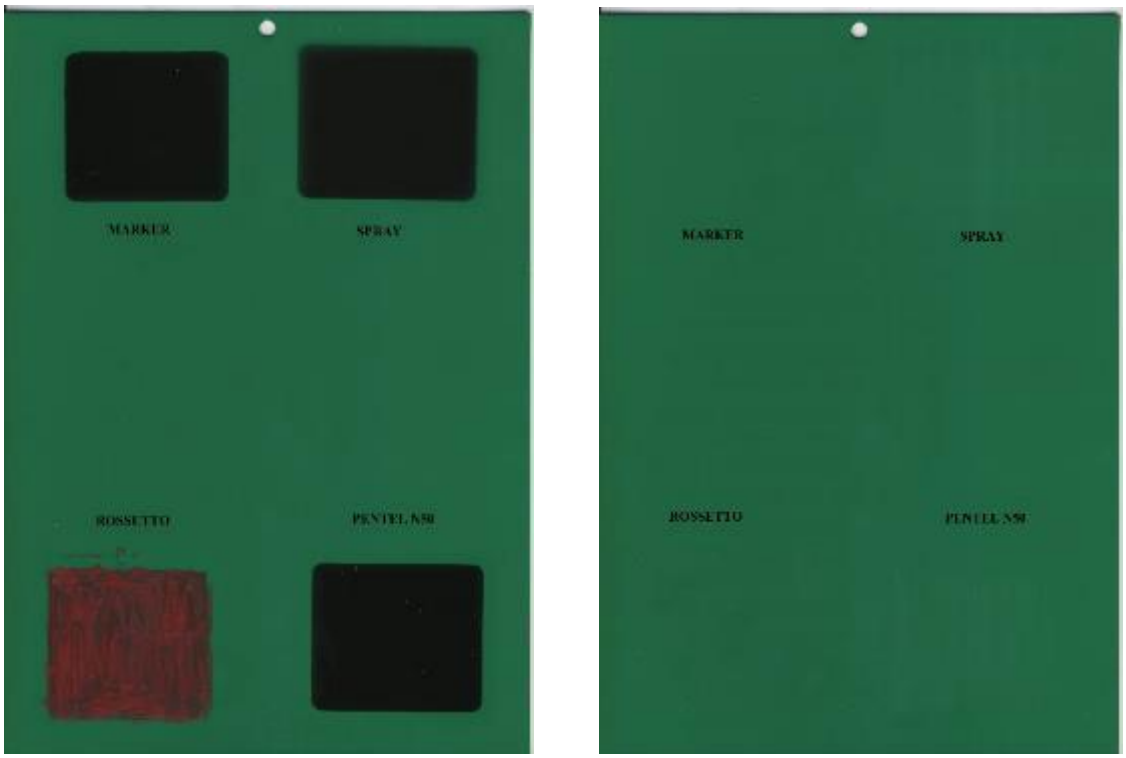
Anti-graffiti Powder Coatings

**Test on a sample panel painted with 11B-175-A038 (PU Smooth Green Anti-graffiti "RAL 6029")**




LEFT: Sample panel painted and soiled.
RIGHT: Painted sample panel after the cleaning with a mixture of etasol/MEK 70:30.

***Effectiveness of cleaning products depending on the staining agents tested on PU powder in RAL colors***

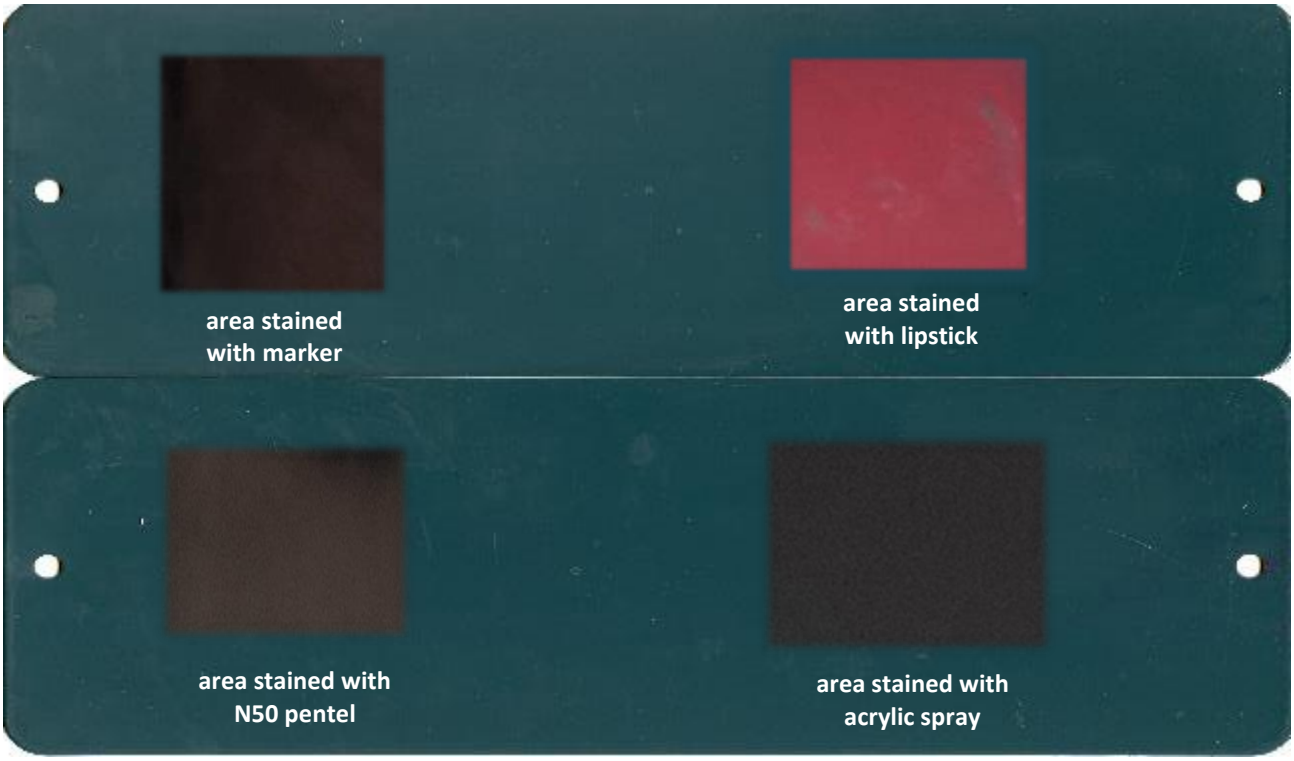
| CLEANING PRODUCTS | STAINING AGENTS | | | |
|---|---|---|---|---|
| |  |  |  |  |
| | ***LIPSTICK*** | ***MARKER permanent marker*** | ***N50 PENTEL permanent marker*** | ***SPRAY Acrylic matt*** |
| ***ETH. ALCOHOL*** | ***V*** | ***V*** | ***V*** | **X** |
| ***ETASOL/MEK**** | ***V*** | ***V*** | ***V*** | ***V*** |
| | **Excellent cleaning results with ethylic alcohol** | **Excellent cleaning results with ethylic alcohol** | **Excellent cleaning results with etasol/MEK*** | **Excellent cleaning results with ethylic alcohol** |

***mixture etasol:methylethylchetone 70:30**

The anti-graffiti properties were also tested by soiling some sample panels painted with 6.445.8716-SJA. This test included the following stages:

- Soiling with lipstick, marker, N50 pentel, acrylic spray;
- Drying of staining agents in an oven at 80°C (176°F) for 120';
- Conditioning, at 23°C (73.4°F), for at least 120' with 50% relative humidity;
- Removal of staining agents with commercial ethylic alcohol;
- Removal of staining agents with a mixture of Etasol/MEK 70:30.

**Test on 6.445.8716-SJA**




ABOVE: Sample pannel painted and soiled

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ABOVE: Painted Sample Pannel after the cleaning with a mixture of Etasol/MEk 70:30

***Effectiveness of cleaning products depending on the staining agents tested on 6.445.8716-SJA***

| CLEANING PRODUCTS | STAINING AGENTS | | | |
|---|---|---|---|---|
| |  |  |  |  |
| | ***LIPSTICK*** | ***MARKER permanent marker*** | ***N50 PENTEL permanent marker*** | ***SPRAY Acrylic matt*** |
| ***ETH. ALCOHOL*** | ***V*** | ***V*** | ***V*** | **X** |
| ***ETASOL/MEK**** | ***V*** | ***V*** | ***V*** | ***V*** |
| | **Excellent cleaning results with ethylic alcohol** | **Excellent cleaning results with ethylic alcohol** | **Excellent cleaning results with etasol/MEK*** | **Excellent cleaning results with ethylic alcohol** |

***Mixture etasol: methylethylketone 70:30**

### 7. Resistance to chemicals

Anti-graffiti series resistance to chemicals has been tested. The first test was carried out by pouring 1 ml of commercial acetone* on the surface of a sample coated with *PE411 + DS-0810SA*; after 10 seconds the solvent was removed with a soft cloth. The test was simultaneously performed on a standard white polyester.

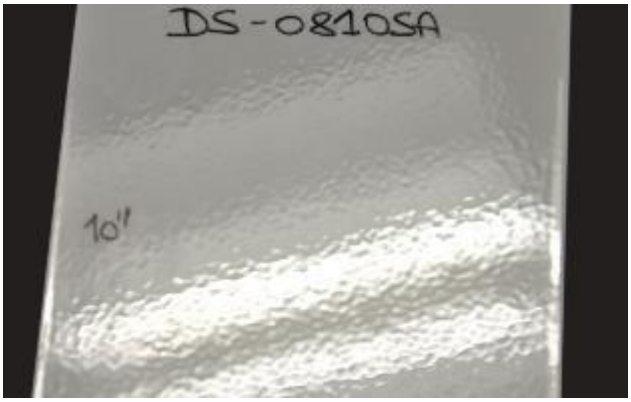
***mix 90:10 of acetone: water**

Commercial acetone

The test has shown how a standard powder coating lose gloss when it comes in contact with aggressive solvents like acetone, leaving a mark on the area previously stained and thus damaging the surface of the sample.

On the contrary, the sample coated with the *anti-graffiti* product *DS*-0810SA has remained totally unchanged, without loss of gloss and stains, thus giving proof of its exceptional resistance to aggressive solvents.


Standard polyester: it is possible to see the stain left by acetone




Anti-graffiti product: the solvent has left no stain

*** mix 90:10 acetone: water**

# SERIES 11X-XXX-YYYY

Anti-graffiti Powder Coatings

The second test aimed at ascertaining the surface resistance of anti-graffiti class 2 powders to oily substances. The test has been carried out on the following samples:

- PE 411 + DS-0810SA
- PE 411 + DS-0707SA
- PE 411 + DS-0407SA

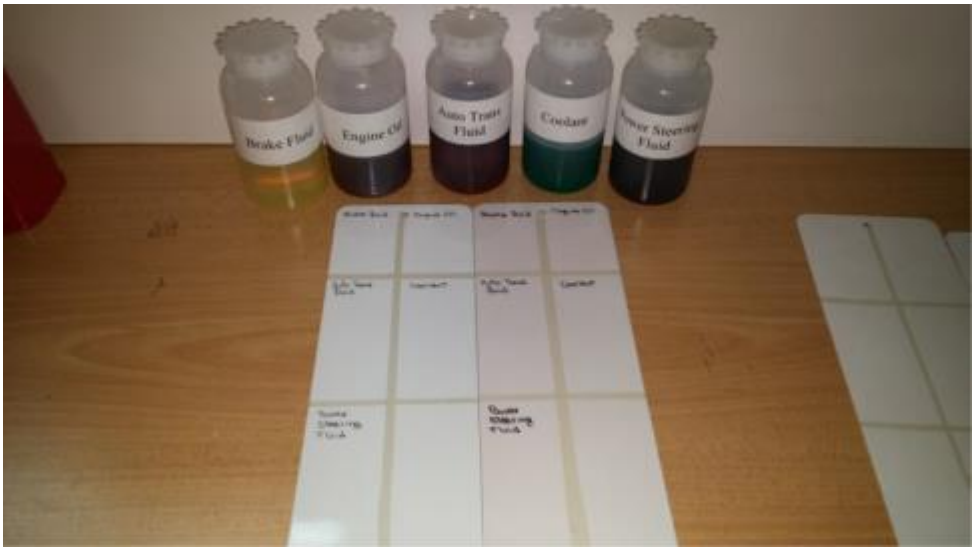
By using the following substances:

- brake fluid;
- engine oil;
- transmission fluid;
- coolant;
- power steering fluid;
- petrol;
- diesel.


Oily substances

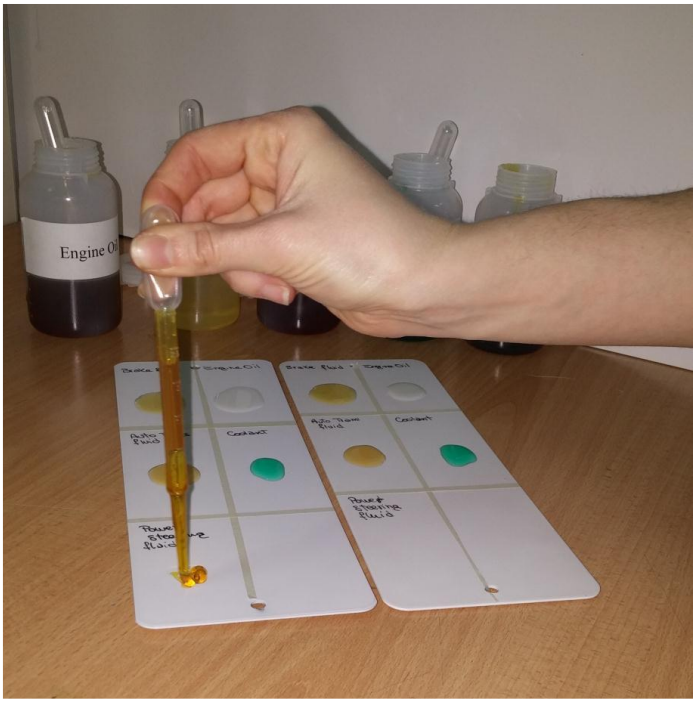

Oily substances

1. Each sample has been divided into different areas, upon which has been put a few drops of the oily substances listed above.



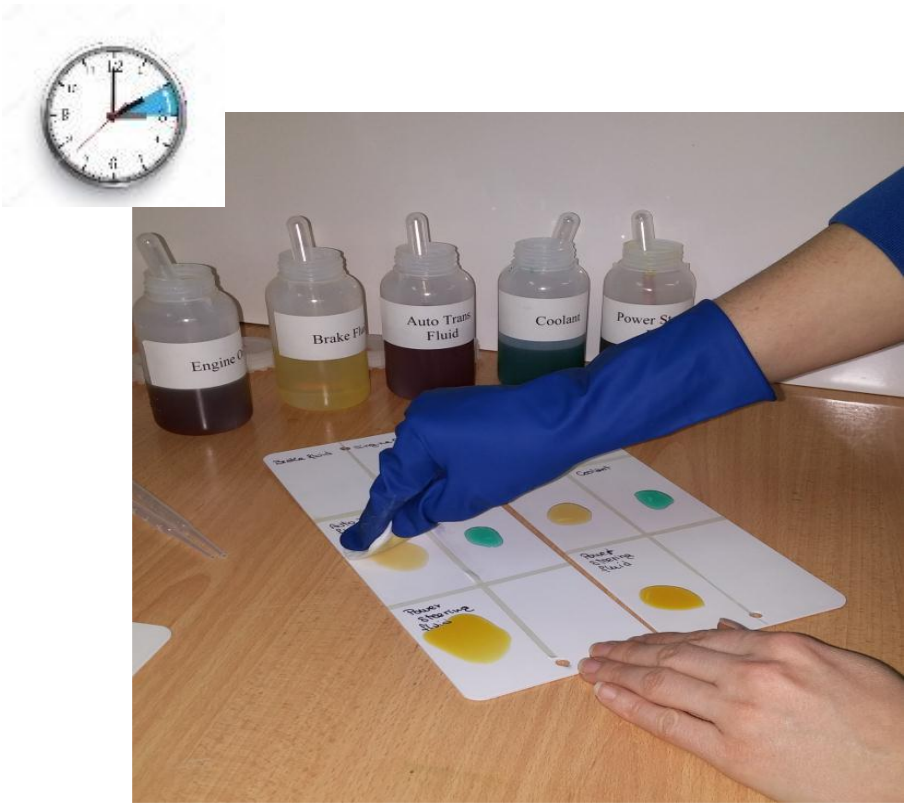

Sample preparation


Sample preparation




Sample preparation

2. All the substances were allowed to react for one hour. After one hour the sample was washed with soap and water and subsequently visually evaluated.




Sample cleaning

Sample cleaning

| | PE411+DS-0810SA | PE411+DS-0707SA | PE411+DS-0407SA |
|---|---|---|---|
| **BRAKE FLUID** | OK | OK | OK |
| **COOLANT** | OK | OK | OK |
| **PETROL** | MARK | MARK | MARK |
| **DIESEL** | OK | OK | OK |
| **TRANSMISSION FLUID** | OK | OK | OK |
| **ENGINE OIL** | OK | OK | OK |
| **POWER STEERING FLUID** | OK | OK | OK |

**CONCLUSION**

After one hour, the exposure to oily substances has not caused damages to any of the 3 categories of class 2 *anti-graffiti* powders. The products are very efficient against this kind of staining agents. Concerning fuel, instead, they are efficient against diesel but not against gasoline. Indeed, this last leaves a mark which cannot be removed even by cleaning.

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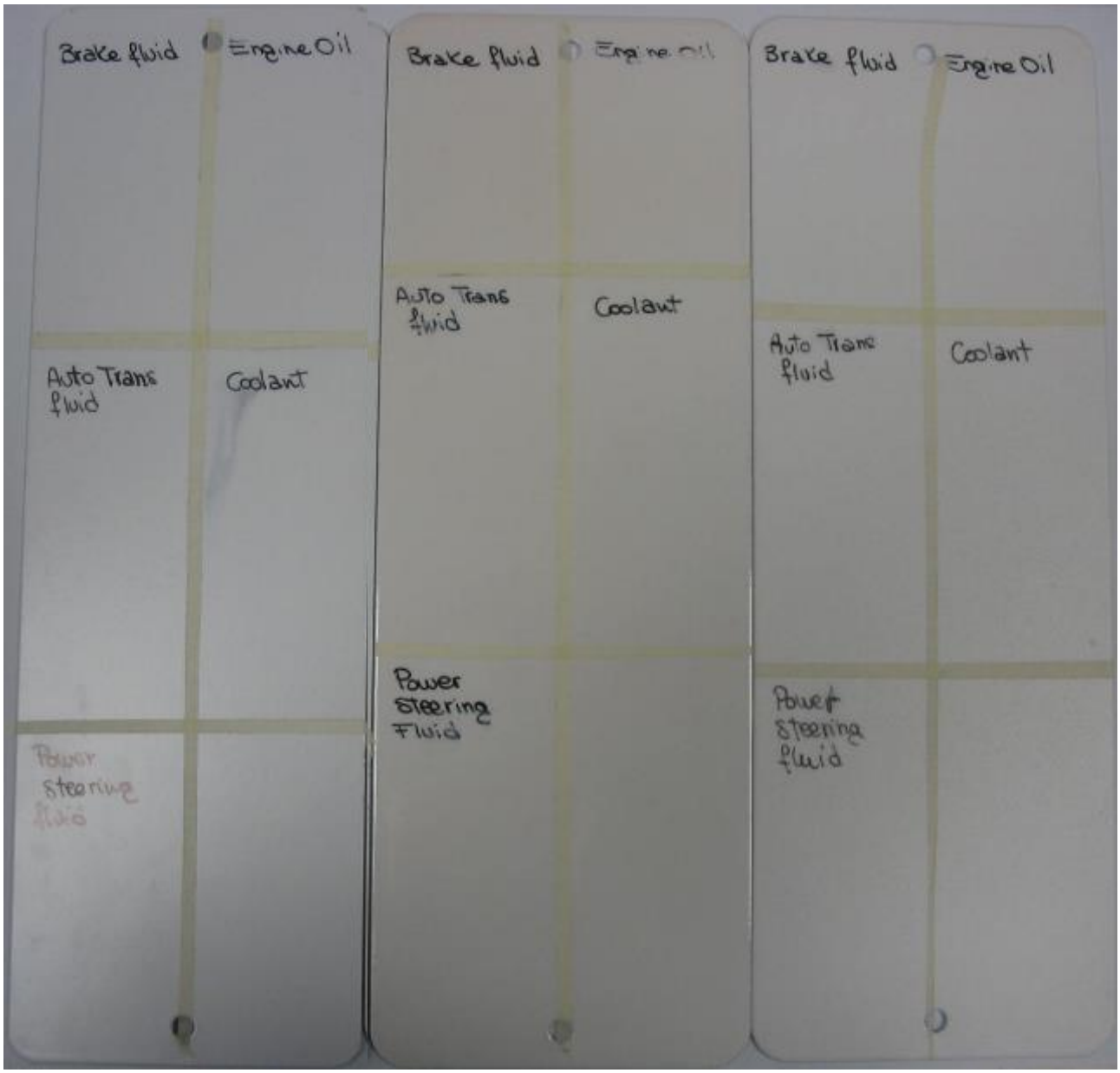
Anti-graffiti Powder Coatings




**Results**: on the left PE 411+DS-0707SA, in the middle PE 411+DS-0407SA, on the right PE 411+DS-0810SA

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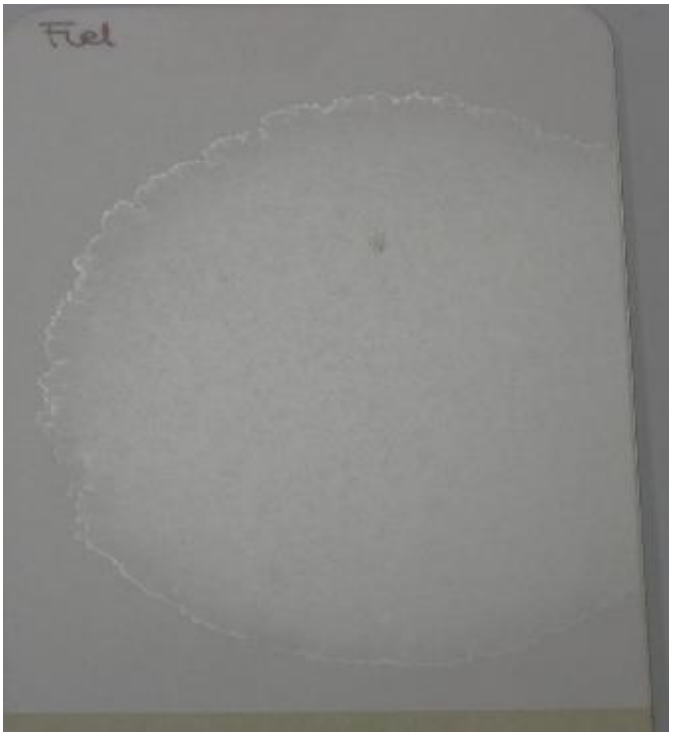
Anti-graffiti Powder Coatings


**Results**: <u>on the left</u> PE 411+DS-0707SA, <u>on the right</u> PE 411+DS-0407SA, <u>below</u> PE 411+DS-0810SA




**<u>WARNING</u>**

**We advise the client to consult DecoralLab technical department before purchasing or using Anti-graffiti powders and before removing the staining agent.**

Marchi di qualità registrati di Decoral System:

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