UV COATINGS: BASICS AND NEW APPLICATIONS

A UV plant from the point of view of a coating manufacturer

SILAP

PoliEFUN

POLITECNICO DI MILANO

1 INTRODUCTION

Why UV technology?

SILAP PRODUCT

POWER SUPPLY FOR
UV LAMPS

- Output power range 3-27 kW
- Two cooling systems available
- Energy saving feature

Common fields of application

- **Wood industry**
  - UV coating curing on:
    - Flat wood panels
    - Wood edges
    - Etc…

- **Graphic industry**
  - Curing of UV inks on:
    - Newspapers and magazines
    - Product labels
    - Packaging films
    - Etc…

Partnership

ELIOS

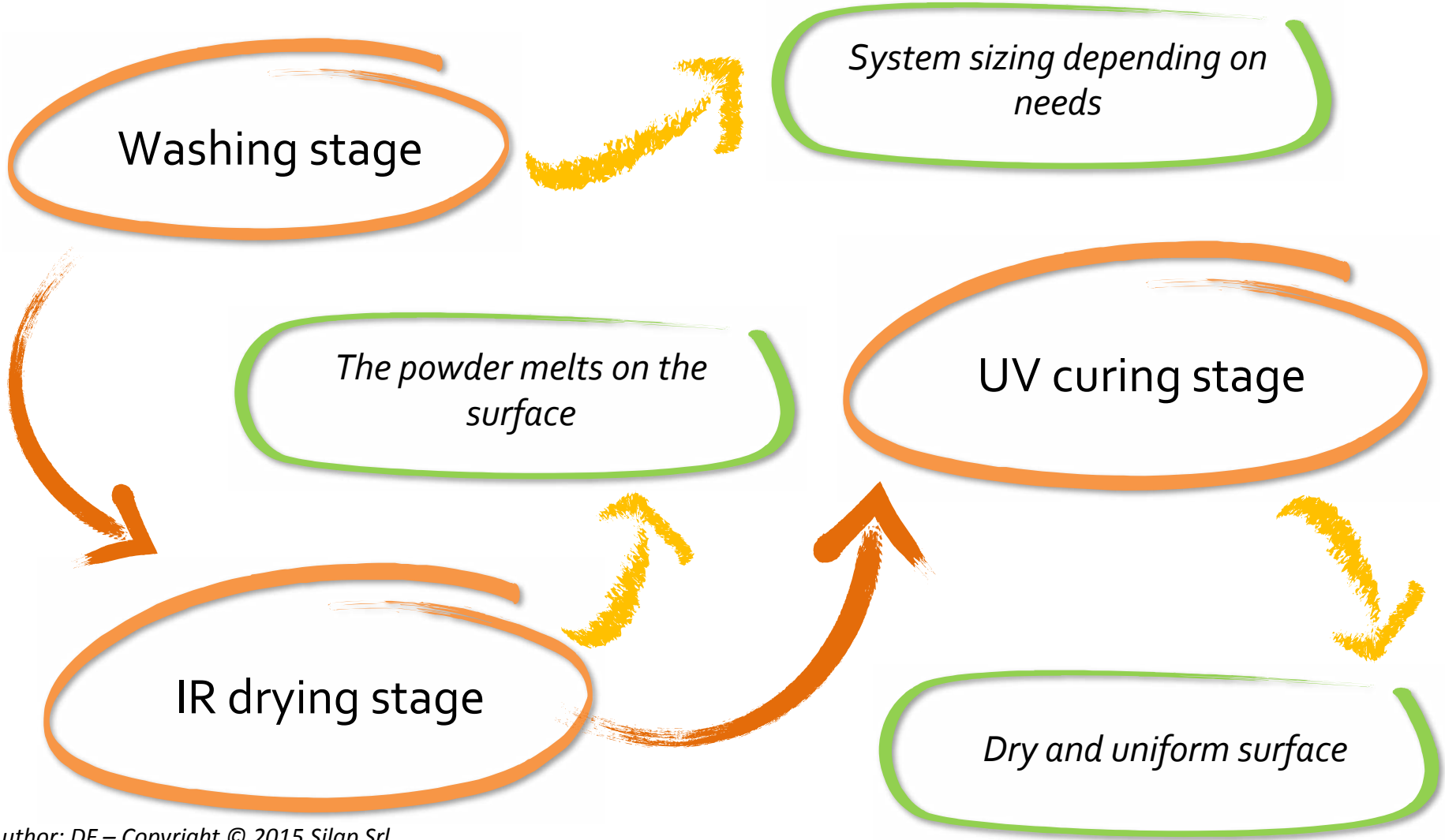
NUOVO IMPIANTO DI VERNICIATURA CON

TECNOLOGIA UV A POLVERE POLIMERICA

In collaboration with

EUROIMPIANTI
MACCHINE PER VERNICIARE
PAINTING EQUIPMENT

The challenge: powder UV coating on sheet metal



2 FEATURES AND GENERAL COMPARISON

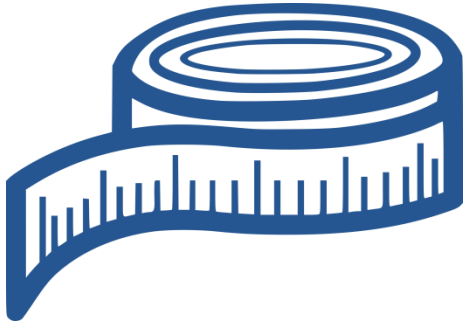
Why UV powder coating on sheet metal?

Production time reduction

Standard powder coatings has a drying time about 25 minutes

Due to curing time and the conveyor speed, it needs equipment of several meters length

Shrink the equipment

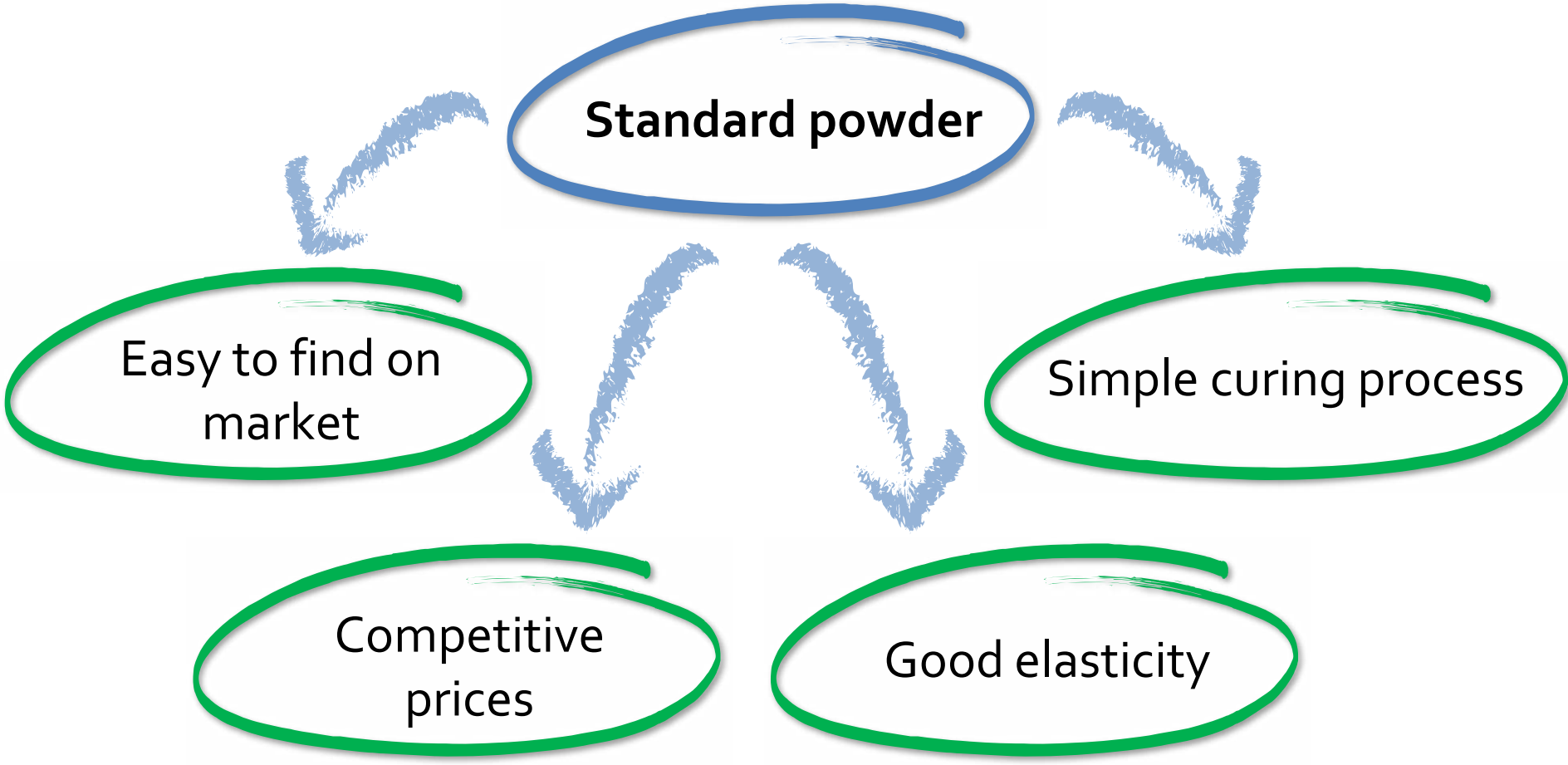


Why UV powder coating on sheet metal?

Coating of heat sensitive materials

The curing of Standard powders need a temperature about 180-200°C for 15-20 minutes

Pros and cons of UV powder VS standard one



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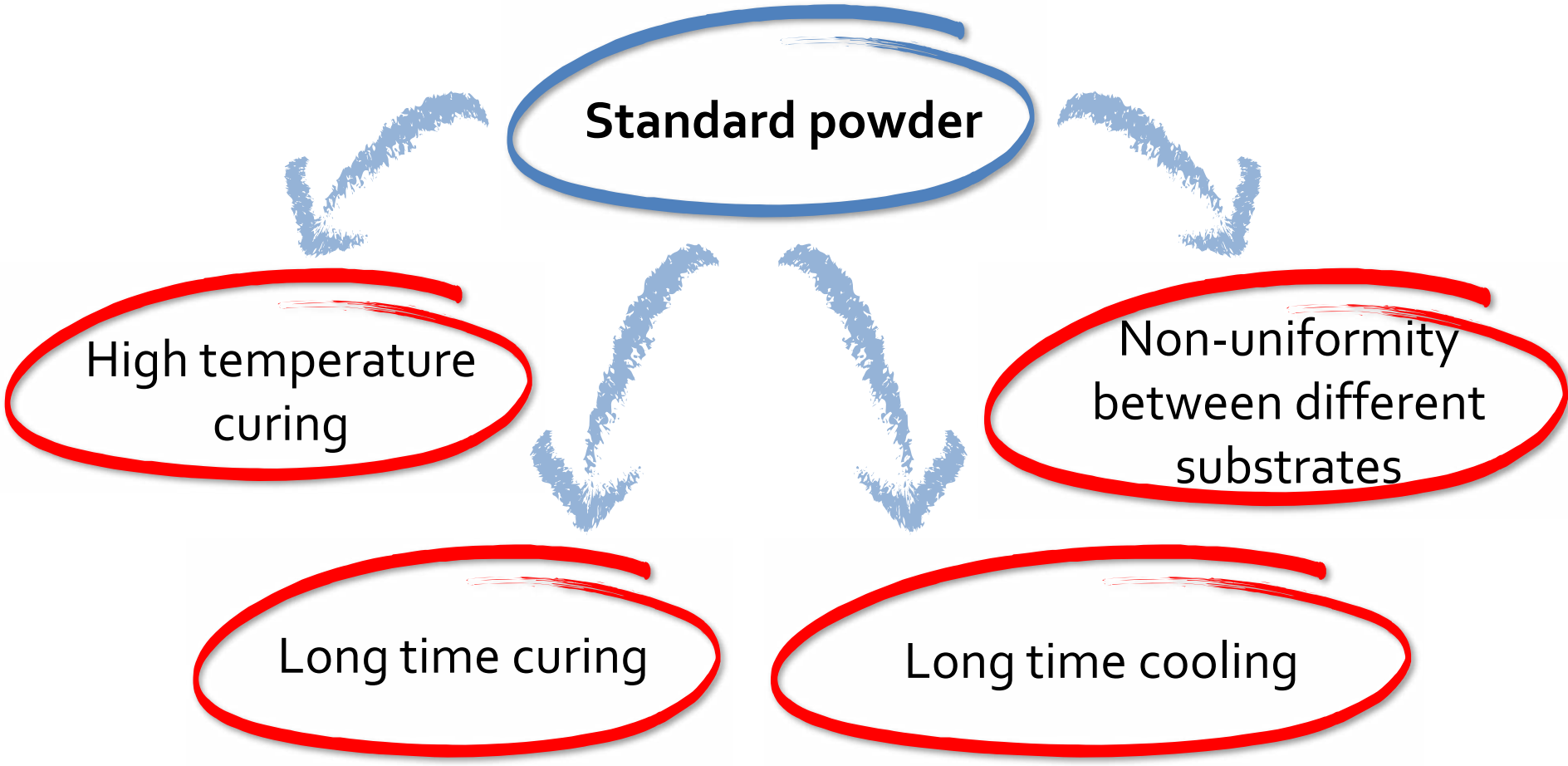

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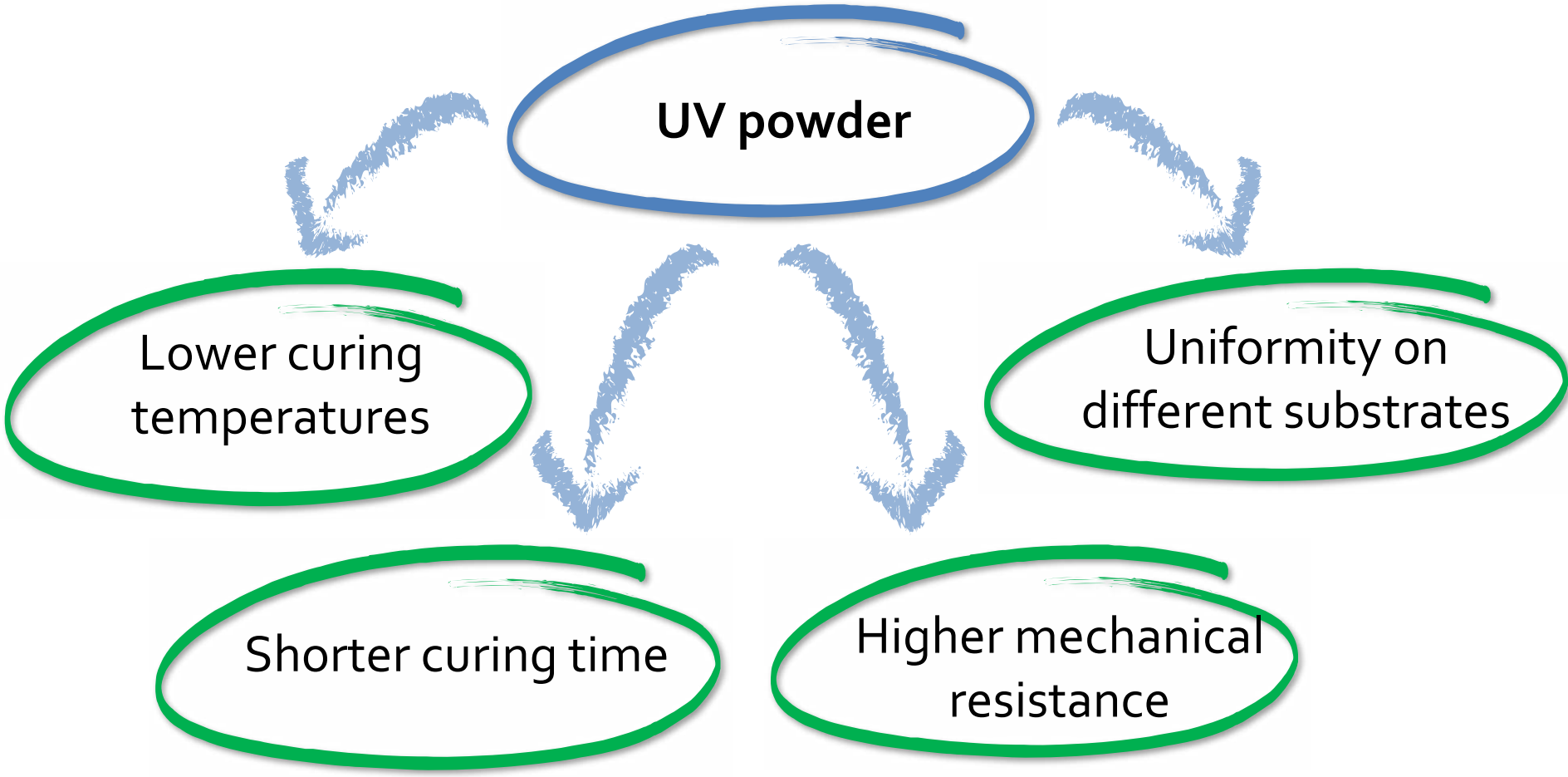

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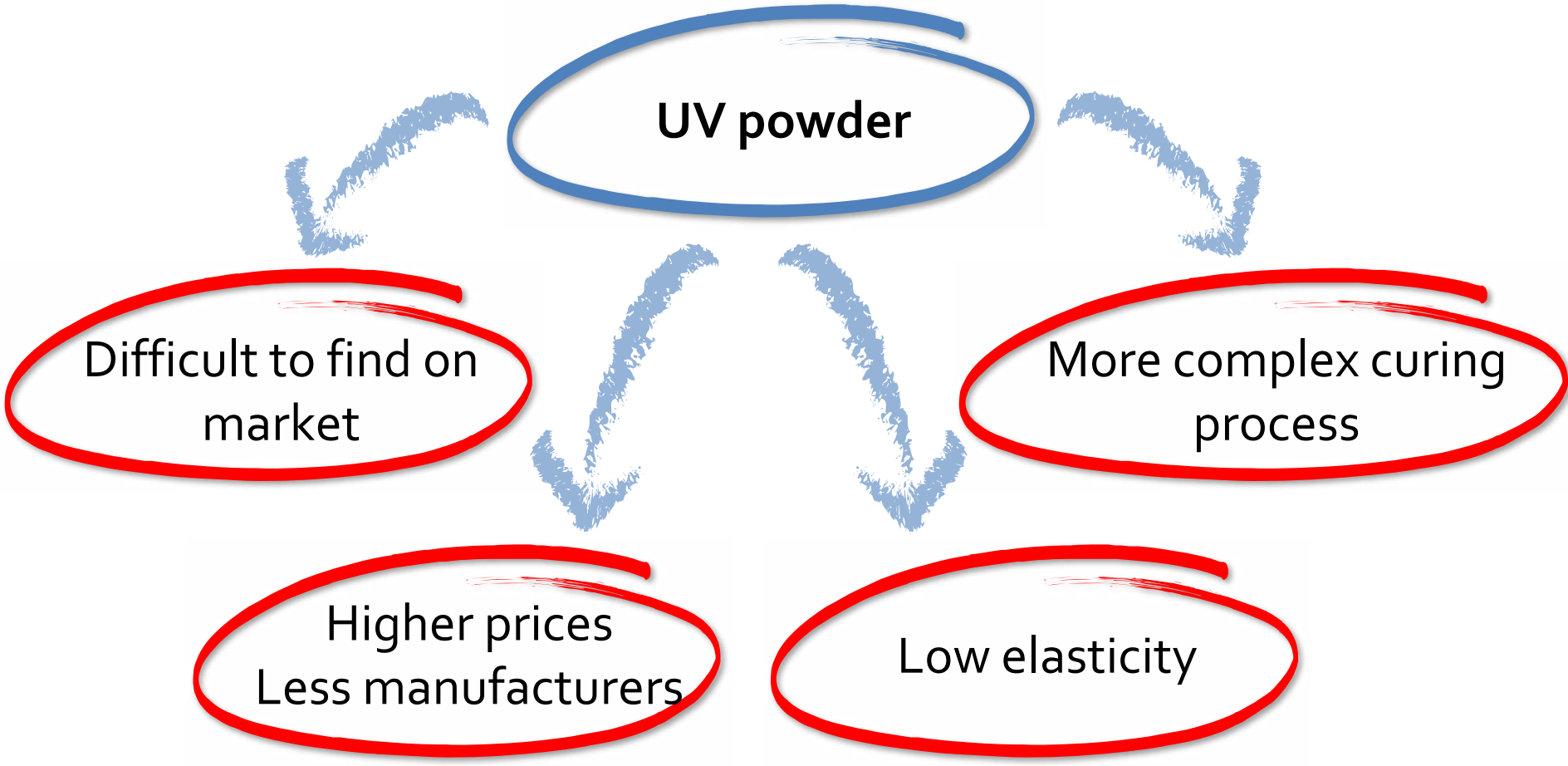


Environmental impact

Powder dispersion (approx values)

30-40% STANDARD POWDER

2-5% ULTRAVIOLET POWDER

Data by Euroimpianti Srl

Environmental impact

Energy saving

0 **FUEL USING**

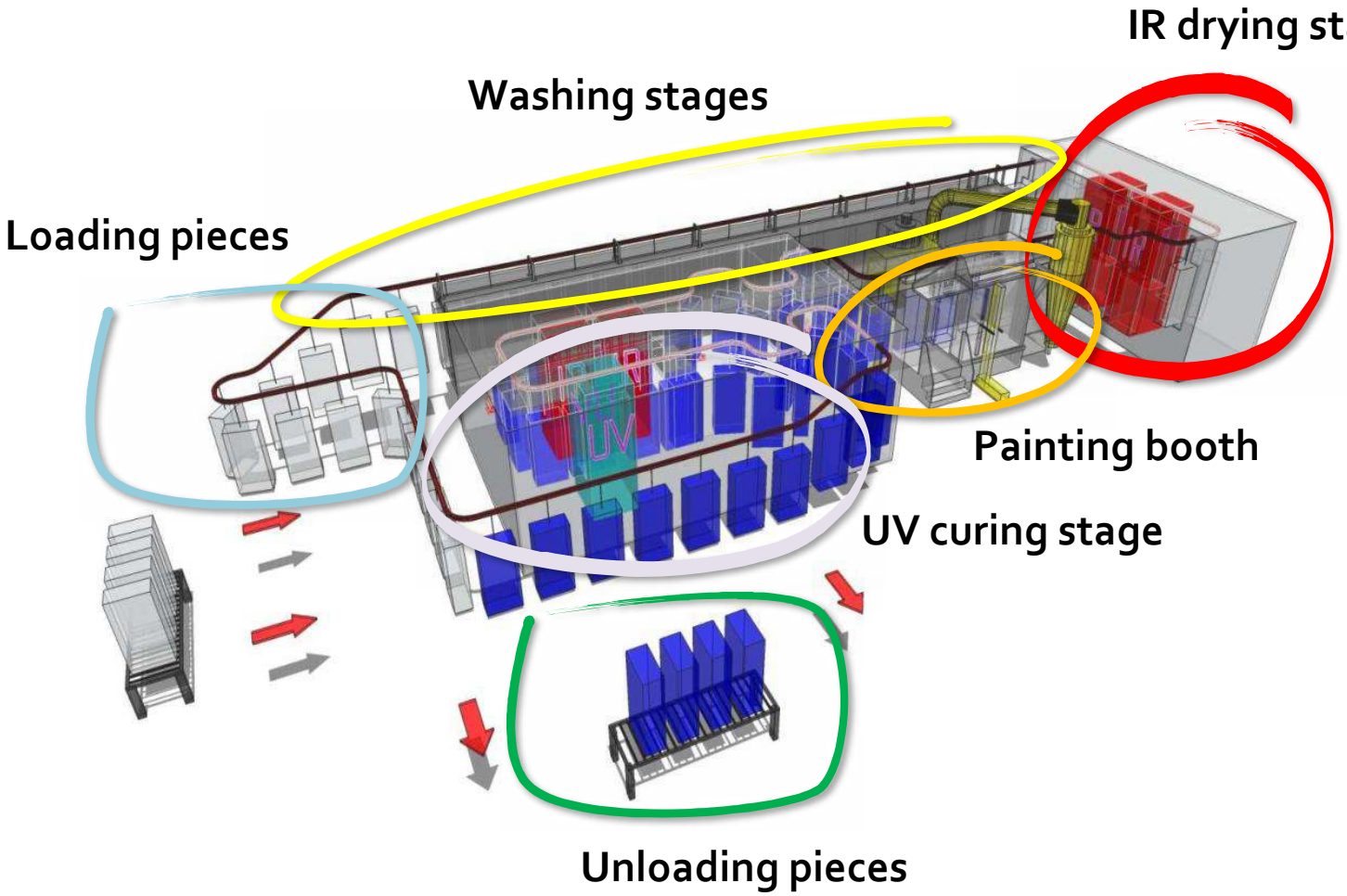
WORKING SPEED

2 **TIMES FASTER THAN STANDARD SYSTEMS**

Data by Euroimpianti Srl

3 EQUIPMENT LAYOUT

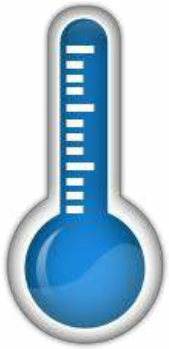
Equipment stages



4

PAINTING TESTS

Problems occurred



Gelification step with IR lamps

Allow get a constant temperature over the entire surface to be painted

Maintain this temperature until reaching the UV lamps section

Problems occurred

Get whole surface lighted

Allow uniform irradiation on the whole surface, including the undercuts

The powders tested

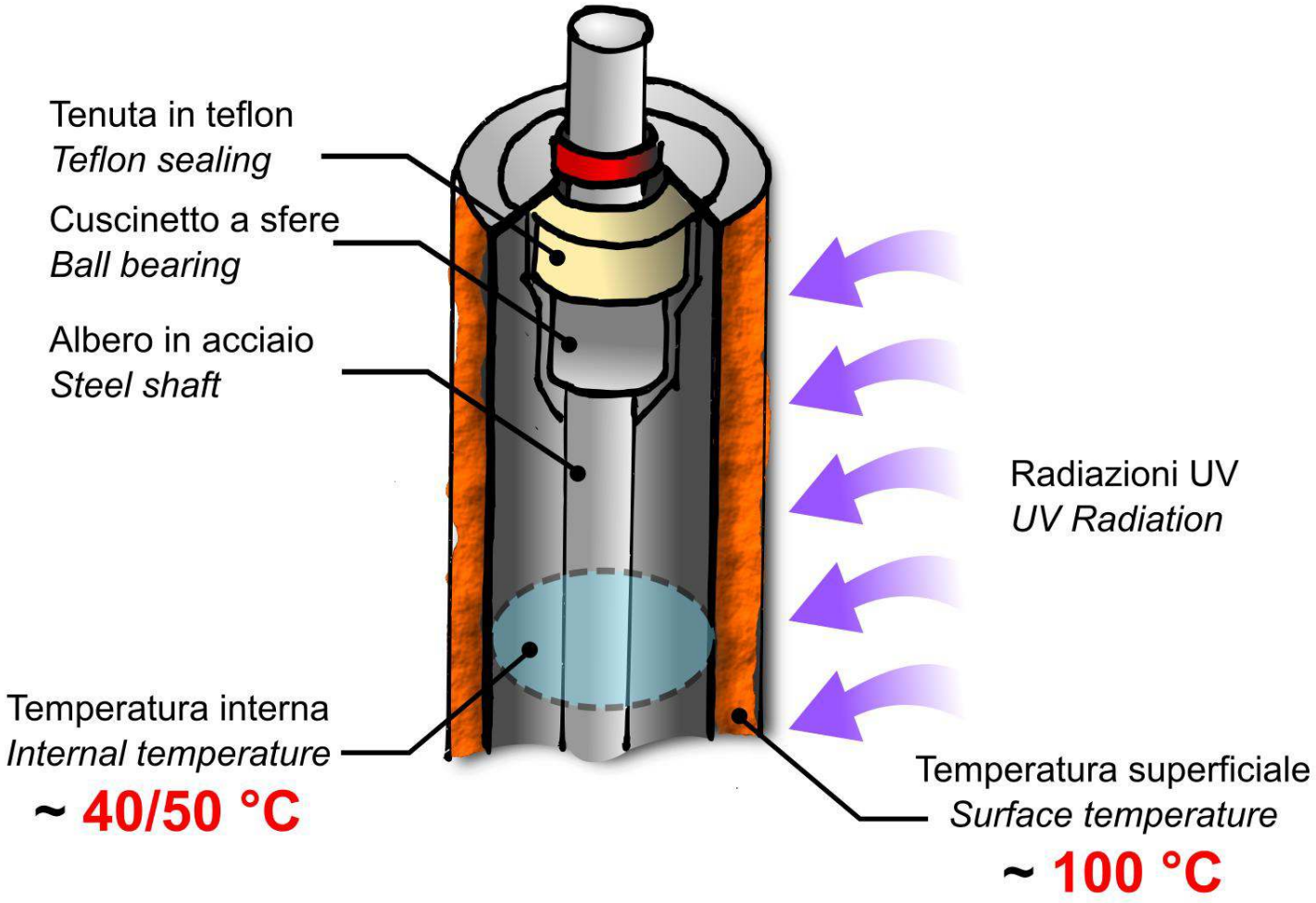
Supplier name \ Test result			
Supplier 1	0	0	100%
Supplier 2	70%	30%	0
Supplier 3	0	100%	0
Supplier 4	0	0	100%
Supplier 5	0	0	100%

The powders tested

Supplier name \ Test result			
Supplier1	0	0	100%
Decoral® System	**70%**	**30%**	**0**
Supplier 3	0	100%	0
Supplier 4	0	0	100%
Supplier 5	0	0	100%

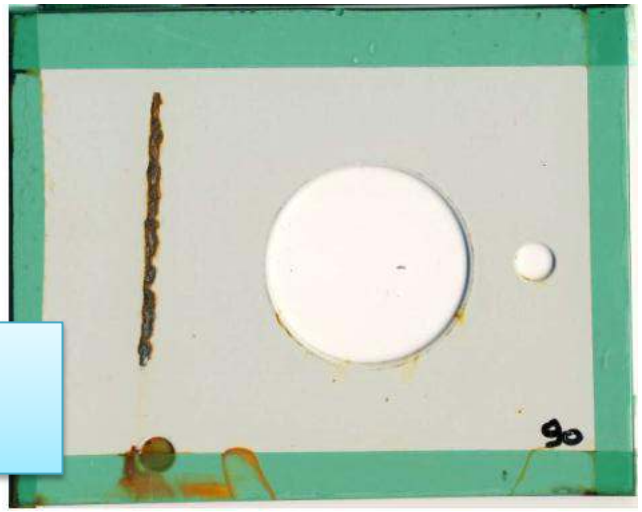
Thanks to the success of the various tests and the availability shown in regard of Silap, **Decoral System** was chosen as preferred supplier of UV powder

Test 1 – Painting of roller conveyor element



Test 2 – Corrosion test

Sample (A)
Standard powder paint

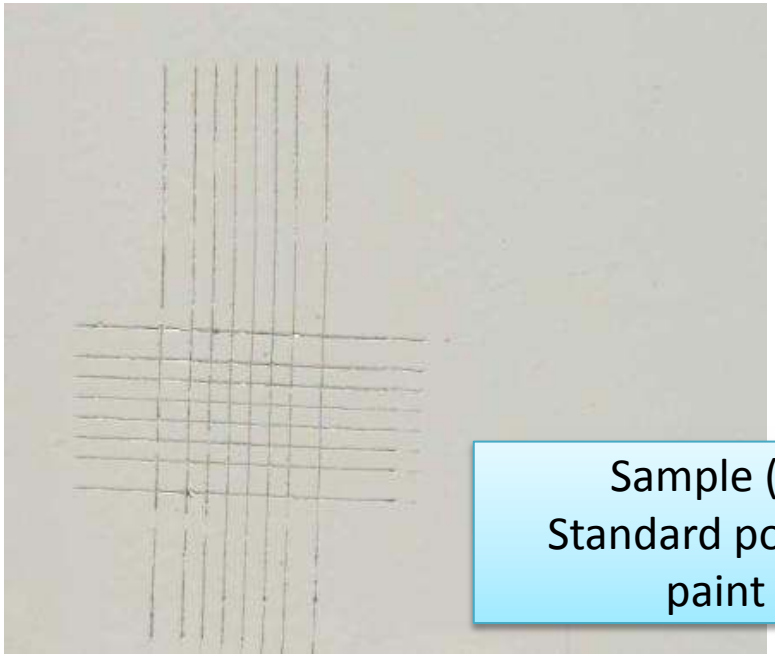


Sample (B)
UV powder paint

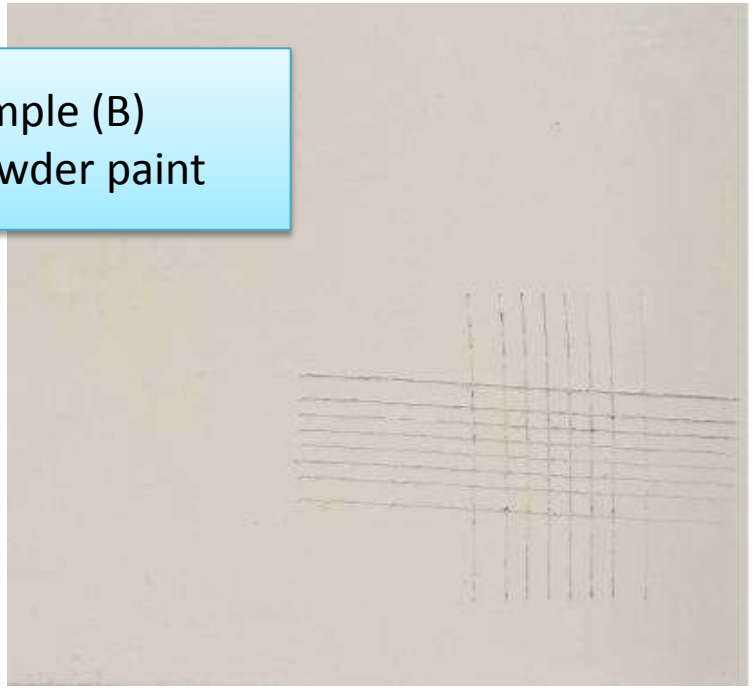
Time of degradation After 400 h of salt spray	Sample A		Sample B	
Blistering	Dim.	Density	Dim.	Density
	3	1	0	0
Rusting	0		0	
Cracking	0		0	
Peeling	0		0	

Test made in collaboration with Decoral® System

Test 3 – Cross cut test



Sample (A)
Standard powder paint



Sample (B)
UV powder paint

	Thickness	Result
Sample A	80 um	No detachment
Sample B	85 um	No detachment

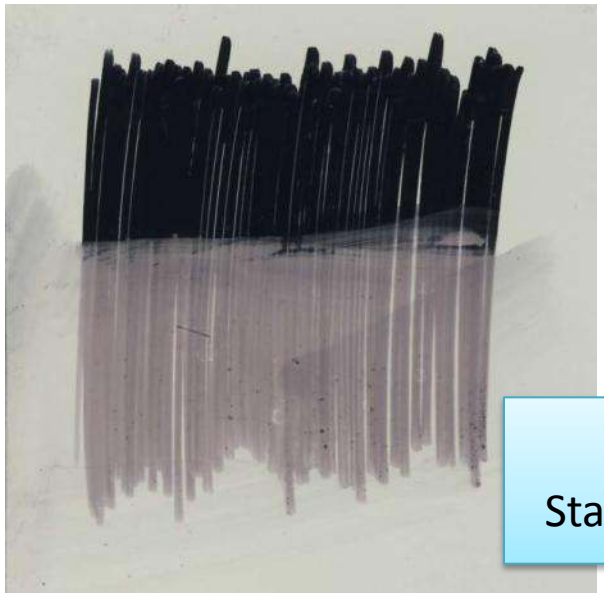
Test made in collaboration with Decoral® System

Test 4 – Buchholtz test

	Result
Standard powder	111
UV powder	111

Test made in collaboration with Decoral® System

Test 5 – Graffiti-proof test



Sample (A)
Standard powder paint

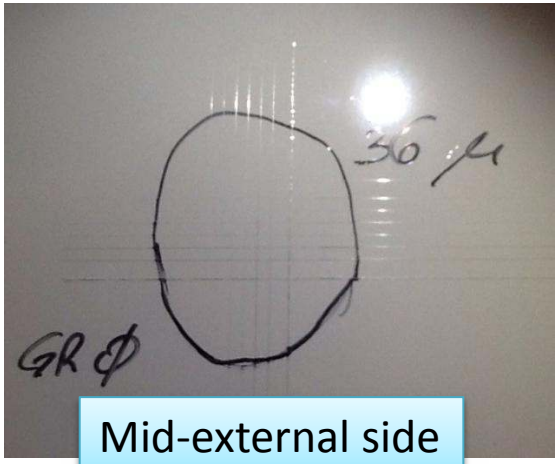
Sample (B)
UV powder paint

Cleaning solvent	Elapsed time	Sample A	Sample B
Ethanol / isopropanol 70/30	24 h	Clear trace	No trace
	1 week	Clear trace	No trace

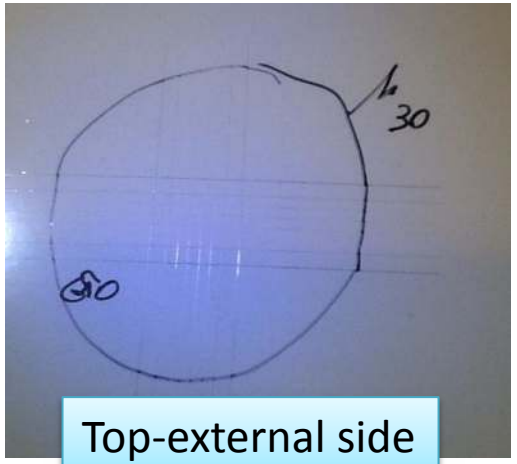
Test made in collaboration with Decoral® System

Test 6 – Adhesion test

Sample to test

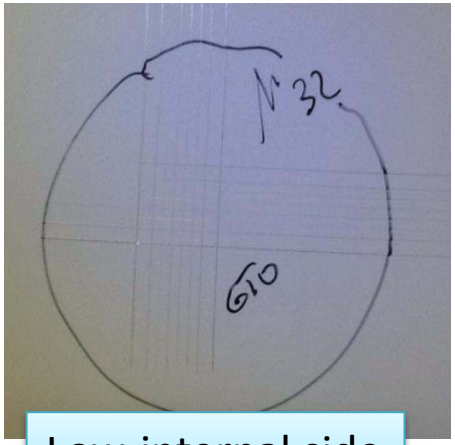


Mid-external side



Top-external side

Top-internal side

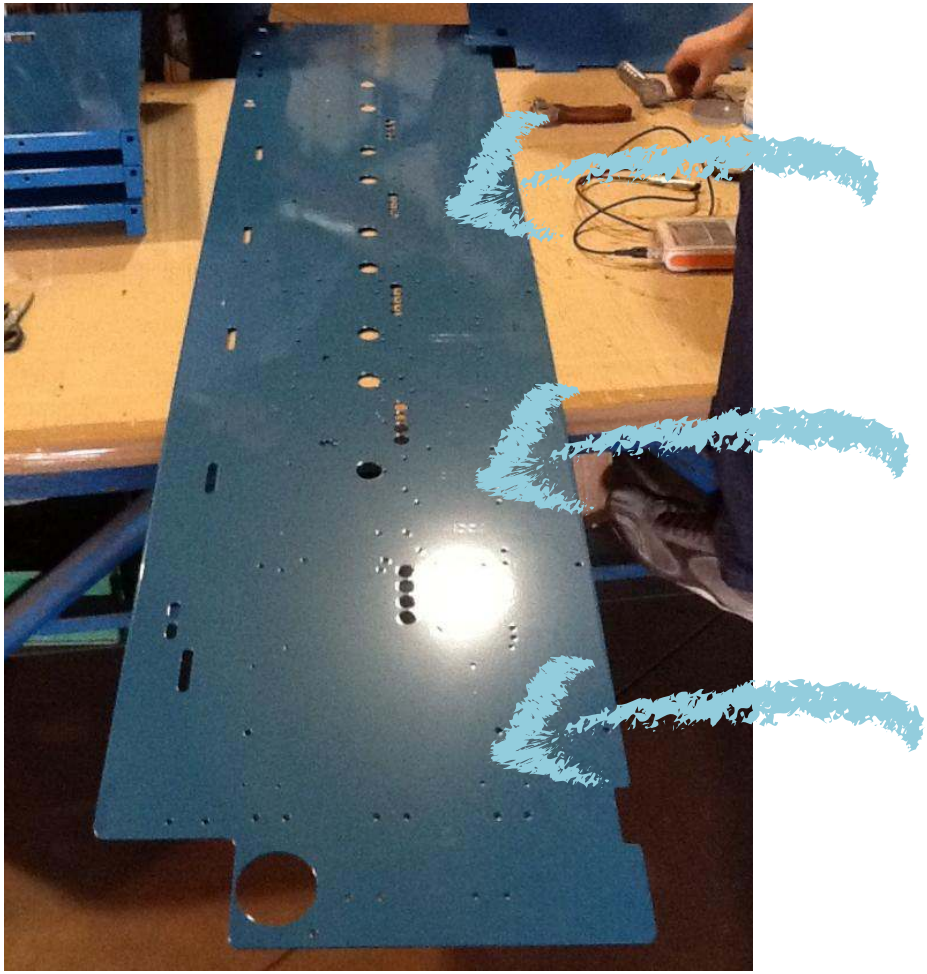


Low-internal side

Test 7 – Elasticity and undercut tests

Minimal thickness
The bending caused no deformation of the powder

Test 8 – Uniformity test of painting



Total length
2 meters

Powder uniformity
regular

Adhesion
stable

Summary

Due to our experience we are able to say that UV powder characteristics are:

✓ PROS

- ✓ High mechanical resistance
- ✓ Quick packaging thanks to low working temperature
- ✓ Very good surface uniformity with lower coating thickness

× CONS

- × Higher powder price
- × Compliance of parts depends on the strict respect of all painting phases

SILAP

THANKS FOR THE ATTENTION