

## Latest achievements in the field of modern surface treatment

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### Rescoll in few words...





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#### **4** business units Analysis & R&D caracterisation B to B **Punctual basis Collaborative Projects** Year contracts Internal Research Analysis Vouchers RESCOLL Centre Technologique Experts for the court EWF bonding Experts for the EC University **REACH and GHS Experts** Customised trainings Expertises Training 2 affiliates units RMG STILZ Chimie Manufacturing Scale-up

**Production** 

Machining



## Rescoll – Surface division activities

- Related topics :
  - Surface preparation of materials.
  - Adhesion.
  - Processing :
    - Functional primers.
    - Functional coatings.
    - Paints.

#### Comprehensive approach comprising different aspects:

- Multi-skills (Formulation, Implementation, Characterization, ...)
- Multi-topics.  $\checkmark$
- Multi-materials.
- Interdisciplinary.





#### Surface treatments: advantages vs. inconveniences





Implementation processes



### Aircraft applications





### Thermochromic coating



- Next generations of Aircraft extand the use of Organic Matrix Composites
- But OMCs:
  - Sensitive to temperature change
  - ✓ High temperature environments are critical
- The use of OMCs are critical in reactor zone due to backfiring





- ✓ What temperature has been shown by the OMCs
- If the CMO's can be repared or replaced
- Concept: Thermochromic sensitive coating







Fourmi <u>2 Partners:</u> Rescoll Mapaéro



Mapaéro

### Fire resistant coating



- Fire resistant evaluation (ISO 2685 flame 1200°C)
- Substrate: AA 5xxx + Top-Coat RESCOLL.
- Compatible with aeronautic applications (T° >200°C / fluids compatibility)
- Performance : Evolution of temperature on non exposed surface







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## High temperature resistant coating







#### Development of thermal resistant coating

- Up to 200 300°C
- Low VOC (< 420 g/L)</li>
- Regulatory compliant
- Implementation by spraying with low thermal curing

Clochette <u>3 Partners:</u> Rescoll Mäder Airbus helicopter





16

break (Mpa)

8

stress

### Adhesion promoter coating



- Coating for improvement of bonding properties on composite
- Clean one-stage process, free VOCs and small particle emissions
- Coating properties





## Adhesion promoter & anticorrosive coating

- Adhesion promoter and anticorrosive coating for bonding assemblies
- Substrate: AA 2xxx, 5xxx and 7xxx

Adhesion property



KO



Rescoll 336h NSS (ISO 9227)

OK



>

### Anticorrosive & biocide coating



- Multifunctional coating dedicated to gas tank.
- Concept:

<u>Current systems</u> (65 μm) - Cr<sup>∨l</sup> treatment

- Primer
- Top Coat



#### Passive protection

Organic part: polyaddition Epoxy/amine Inorganic part: Sol-Gel chemistry

#### Active protection Corrosion inhibitor

Biocide agent

Essais	Norme	Résultats	
Thickness	Х	٢	25 ± 2μm
Adhesion	ISO 2499		GT0
Scratch test	ISO 1518		No scratching
Bend Test	ISO 1519		Rmax = 4 kg
Cupping test	ISO1520		No cracking
Resistance to water	ISO 2812/ 4628		No scratching
Resistance to skydrol	ISO 2812/ ISO4628		Rmax = 2 kg
Neutral Salt Smog Test	ISO 9227		No picking after 3000h
Filiform Corrosion	EN 3665	8	Filament L > 4 mm
biocide	Х	Anti-fungal properties	



#### No pitting after 3500 h NSS





FFC after 1056h

SMILE

<u>8 Partners:</u> Rescoll Mapaero L'electrolyse Airbus Dassault aviation EADS Cirimat LCPO



### Anticorrosive coating

Anticorrosive coating dedicated to structural elements (fuselage)

Concept



- > Hybrid material = Significant improvement of corrosion properties
- Importance of matrix precursors



## Anticorrosive coating

**ACET** = Accelerated Cyclic Electrochemical Test >





#### Similar trends >

- Differences due to: >
  - Thickness
  - Localized matrice defects

ACET

-Rapid (24h)

-Quantitative

- Exposed surface

Cathodic polarization



### Anticorrosive coating





#### Conclusion

#### News coating systems have to consider:

- Simple process
- Compliance to regulatory
- Environmental friendly
- Low cost

#### Multi-functional coatings = attractive solutions

- Versatility of composition
  - ✓ Chemistry routes
  - ✓ Fillers
- Easy to handle
  - ✓ Spray deposition
  - ✓ According to usual system
- Reduction of number of layers with increasing functionalities





# Acknowledgements

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#### And you for your attention...



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