The Curing Composite Process Specialist for Aerospace Industry
Activity
- Designing & manufacturing advanced equipment for the Composite Industry

Two core business
- Process Equipment
- Repair Equipment

Industries
- Aeronautics (90%)
- Racing cars (5%)
- Marine
- Winds
Founded in: October 2001, based near Lyon

Turnover: 1.9 million USD

Quality
Certified ISO 9001-2015

Our facilities in France
1) Aeroform Presentation: Aeronautics Sector

Where is Aeroform Business?

- Defense (military): 18%
- Aircraft Manufacturers: 19%
- Airlines: 20%
- Subcontractor/MRO: 43%
1) Aeroform Presentation : some references

Extract of Aeroform Clients who trust our innovation and our quality products

- Airbus Group
- Boeing
- Bombardier
- Dassault Aviation
- ATR
- Saab ...

- RAF
- Royal Navy Netherland
- Ruag
- French MOD ..

- SR Technics
- Sepang Aircraft Engineering
- Toray
- Hexcel
- Aerolia
- Aircelle / Safran
- UTC
- Daher
- CTRM
- Premium Aerotec
Aeroform provides developing, designing, manufacturing solutions to cure composite parts. 100% made in France.
Our new control system AFACS II is easy to use interface with innovating features and Nadcap compliance.
Composite Repair Solutions

- Composite repair training
- Composite repair tools case
- Composite repair equipment & innovative solutions

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Composite Repair: Hot Bonder 6 TCs

Single zone bonder
Composite Repair : Hot Bonder 20 TCs (+10TCs extension)

2 - zone bonder
Composite Repair: Hot Bonder 20 TCs

4- zone
And
5- zone bonder
Composite Repair: Hot Bonder multi-zones

Multizone

Any type of heating equipment

Unlimited heating equipment

Mixing heating equipment

Network bonder
Aeroform Solutions to save time:

1/ SMS module
2/ Wireless module
3/ Rapid curing shim method
4/ Innovative Polymerization tools
This unit will send sms message to operator 's mobile phones when there is an alarm ( OT, Vacuum, limits …) and it is also possible to contact the module at distance to get information from the current cure ie: ( SP, remaining time, Hot TC, Cold TC …)

➤ Give freedom to the operators to do other tasks
Aeroform Solutions to save time

Wireless Module : up to 9 repairs!

- Reduce Length of TCs
- Reduce length of vacuum hoses
- Save time : other tasks
- Up to 9 repairs
- 50 meters in workshop

Control System + Module : 1 to 9 + Heating Sources

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Wireless Module: several repairs in one time!
Wireless Configuration:

Control System
(Manage up to 9 Wireless modules)

1-9 Repairs

Heating Sources Choice

- IR Lamp Premium
- Hot Gun
- Heater Mat
- IR Lamp V2 & V3
- IR Lamp IR4B01

NEW
Wireless Module Concept: up to 9 repairs!
The shimming materials are required to fill small gaps in rib-to-skin and their cure at room temperature takes approximately 12 hours.

Solution for Shim Drying

Liquid Shim
Ex: EA9394 …
Aeroform Solutions to save time:

How to reduce by 5 times the Shim Drying cycle time

Hot Air Box + Hot Air Generator + Control unit =

Heat up at 65 °C during 2,50 hrs @+/- 5°C
Reduce curing time → Save money
Aeroform Solutions to save time:

Rapid curing system:

Helicopter Tail: accelerated polymerisation

5 Zones independently controlled
Rapid Curing resin system: 5 Heating Zones

IDEAL TO
✓ Reduce cycle time by 8 times
✓ ±4°C at 65°C (±7°F @150°F) within 5 zones
✓ Pneumatic opening for 5 boxes

NEW
Super Puma
Aeroform Solutions to save time:

The innovative curing solution for the repairs of tomorrow.
Concept:

- The function: Maintain homogeneous temperature on surface and cutout area with calibrated heating rate.
- Modular: Adaptable to any shape, size, materials, geometrical structure.
- Portable: Usable on site, punctual operation.
- Low consumption: Ecologic, autonomous (for short size area and curing cycle).
- Intelligent: Intelligent system (SMA) to enable the system optimizing its initial configuration, and heating phase. This permit to improve continuously the lead time and the quality of the operation.

Use cases:
- Cosmetic Repair
- Structural Repair
- Liquid Sheam
- Painting drying acceleration
- windows/windshield bonding

Results:

<table>
<thead>
<tr>
<th>Cost</th>
<th>Reduce the time for polymerization operation</th>
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<tbody>
<tr>
<td></td>
<td>Less consumable (for structural repair operation)</td>
</tr>
<tr>
<td>Quality</td>
<td>Improve the quality of the bonding</td>
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<tr>
<td>Delay</td>
<td>Quick repair with mobile and autonomous device (set-up)</td>
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<tr>
<td></td>
<td>Heating/Polymerisation cycle reduced</td>
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Means Overview:

Actual Means

Hot Bonder
- Console controlling the power of the future curing means according with information provided by the intelligent software.
- Information provided by the Thermocouples.

Heating blanket
- Heating means to cure repair.

Thermocouples
- Placed around the repair under the heating blanket.
- Used to measure and transmit the T° at the hot bonder.

Aircraft Mockup
- Provide the damage localisation (area) and the geometry under it.

Intelligent software
- Exchange between hot bonder and intelligent software during curing cycle to consolidate thermal behaviour.
- Thermal mapping: Provide the prediction of thermal propagation on Aircraft structure.
- Calculation algorithm: Provide the temperature prediction on cutout ply according to the temperature measured on the skin.

Future Means

Hot Bonder
- Console controlling the power transmit to heating blanket cording with Thermocouples.

Technology based on simple thermal behaviour

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Use Case: Aircraft composite structure Repair Operation

On aircraft composite structures we are fully aware of the limits of current curing system due to
- the architecture of composite aircraft structure (frame, splice, omega, etc .......),
- the position of the repair area on the fuselage,

Our Solution improve the repair operation with substantial gain:
- **Reduce by 30%** the time to Implement a bonded repair.
- **Reduce by 20%** the cure cycle time.
- Improve the **quality** of the bonding.
- Consume **20% less** consumable (a priority for the environment in addition to cost reduction).
- **Ease operation** with a mobile and autonomous* device.
  (* autonomous for short size area and short curing cycle)
The Project:

A POC have been done and presented to AIRBUS (Repair Operation)

A usable Prototype in development to address composite repair needs
Thank you

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