TOOLING

TOOLS FOR THE COMPOSITE INDUSTRY

corimatec

SOLUTIONS BEYOND BOUNDARIES

WITH MORE THAN 50 YEARS EXPERIENCE IN TOOLING MATERIAL, WE OFFER A COMPLETE RANGE OF MOLDING, ASSEMBLY AND HANDLING SOLUTIONS.

We design and manufacture nickel, composite, steel, invar and aluminum mould tools relative to your needs. We also offer silicone reusable bags that allow you to industrialize vacuum bagging and to decrease your wastes.

MOULD TOOLS

INDUSTRIALIZATION

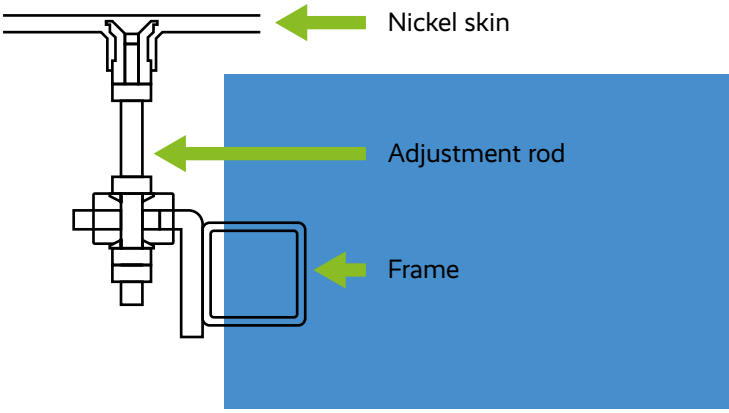
1 NICKEL LAYUP TOOLS

MOULD TOOLS

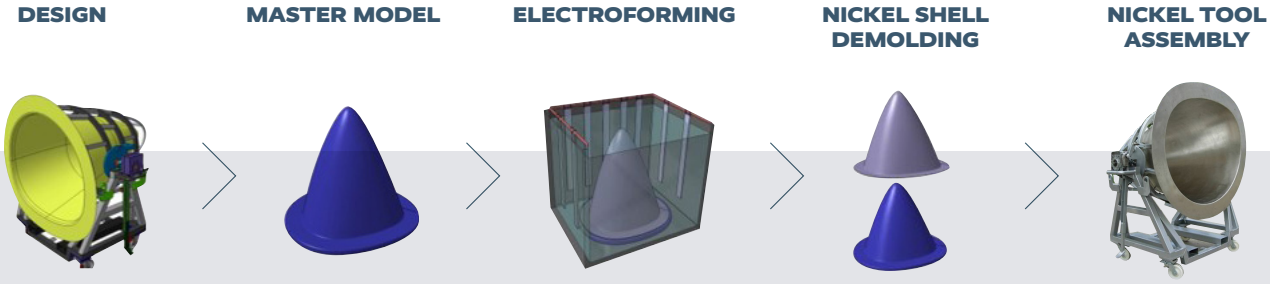
Nickel layup tools are made of a nickel skin with a high HRC hardness, fixed on a steel frame.

Those tools allows a high number of mouldings with good surface quality. The nickel skin, which is nominally 4-6 mm thick, can be adjusted to compensate for spring back by means of adjusters which are located on the steel frame.

SPRINGBACK ADJUSTMENT SYSTEM



NICKEL TOOL MANUFACTURING PROCESS



TECHNICAL DATA

- Nickel thickness around 5 mm
- Steel frames are stress released
- Resistant to 180°C / 356°F
- CTE : 13x10-6/°K

MAXIMUM NICKEL BATH CAPACITY

- 7 x 4 x 2.5 m

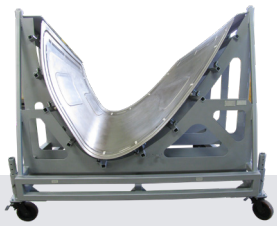
BENEFITS

- Springback adjustment directly on the mold
- Excellent thermal conductivity
- Surface Hardness from 15 to 40 HRC
- Light mold structure
- Corrosion and abrasion resistant

POSSIBLE OPTIONS

- Self heated tool (180° C / 356°F)
- Temperature sensors
- Silicone bag
- Caul plate

A320 Belly Fairing
Made for AIDC



KC390 Forward I SPONSON Landing Door
Made for OGMA

J-Nose A350
Made for Spirit

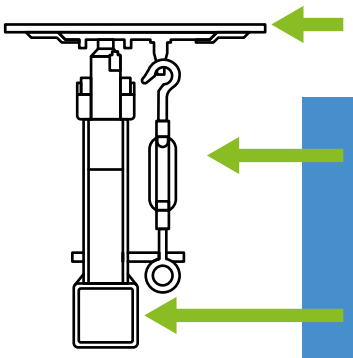
2 COMPOSITE LAYUP TOOLS

MOULD TOOLS

CORIMATEC are **specialists** in large size, complex and precise geometry **composites tools production.**

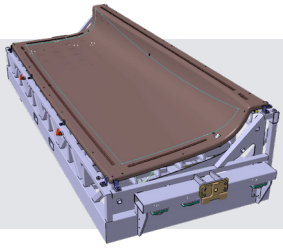
Layup tools are made of a composite skin mounted on a steel or composite frame. Adjusters make the link between the molding surface and the frame.

SPRINGBACK ADJUSTMENT SYSTEM

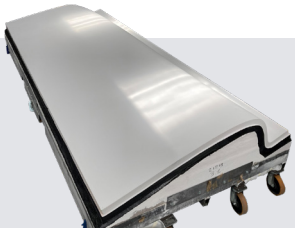


COMPOSITE TOOL PROCESS

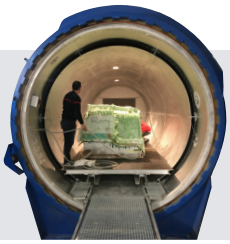
DESIGN



MASTER MODEL

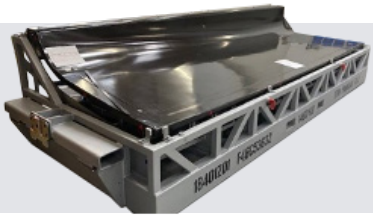


LAYUP / AUTOCLAVE CURING



Autoclave dimensions:
Ø 3 m - L 10 m - 250° C - 10 bar

COMPOSITE TOOL ASSEMBLY



TECHNICAL DATA

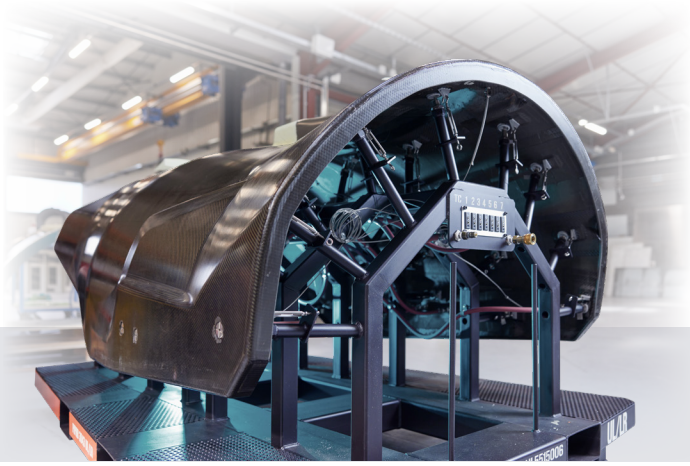
- Low cost masters, 5 axes machined, allowing low cost tools duplication
- Epoxy tools resistant to 190°C (+/-5°)
- BMI tools resistant to 350°C (+/-5°)
- Carbone or glass fiber allowing for CTE requirements

BENEFITS

- Low expansion coefficient
- Low thermal inertia
- Light tool
- Complex surfaces possible
- Strength and mechanical performances
- Short production cycle

POSSIBLE OPTIONS

- Self heating tool (180°C / 356°F)
- Temperature sensors
- Silicone bag
- Caul plate



PIP Pearl 700
Made for Safran Nacelles

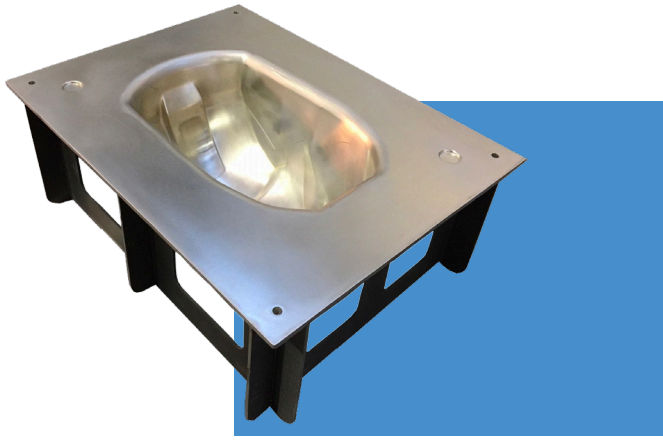
3 HYBRID LAYUP TOOLS « HARDSKIN »

MOULD TOOLS

Composite tools with a metal surface **made by nickel electroforming** on a composite substructure.

Molding surface is pure nickel.

This type of tool has the benefits of both nickel and composite to allow good performances and good surface appearance on molded parts.



TECHNICAL DATA

- Nickel thickness : 400 to 500 µm
- Composite thickness : 6 to 7 mm
- Tool resistant to : 180° C
- CTE : 13x10-6m/°K

MATERIAL

- Electroformed nickel
- Prepreg glass fiber / epoxy resin

BENEFITS

- Surface hardness 240 to 290 HV
- Better longevity than composite tools
- Short tool manufacturing cycle
- Light tool
- Excellent thermal conductivity
- Easy maintenance and clean up

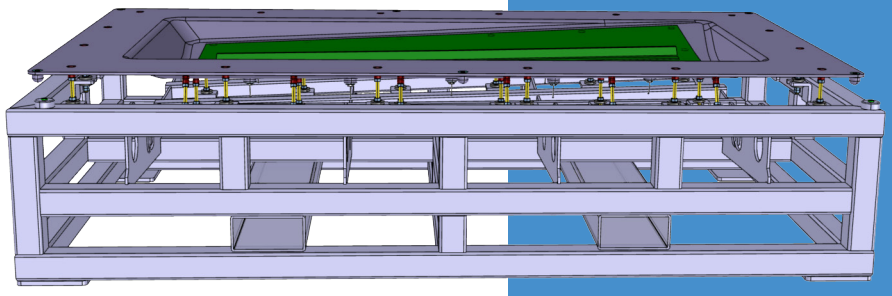
POSSIBLE OPTIONS

- Self heating mold
- Temperature sensors

4 INFUSION TOOLS

MOULD TOOLS

As layup tools, **infusion tools** are made of a mould surface on which dry fiber fabrics are placed. Resin will then flow through the fibers to impregnate them.



It is possible to make infusion autonomous with a self-heating molding surface and a silicone or rubber (AIRPAD type) bag.

MATERIAL

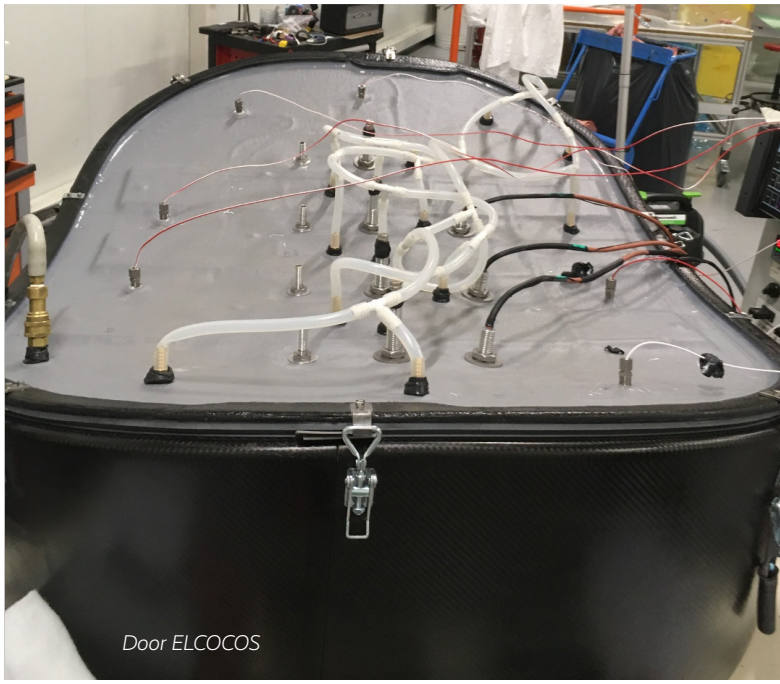
- Nickel or composite molding surface
- Steel or composite frame

BENEFITS

- Excellent thermal conductivity
- Self heating tool
- Light tool

POSSIBLE OPTIONS

- Reusable silicone bag
- Self heating molding surface
- Self heating silicone bag
- Heating control console
- Pressure sensors
- Temperature sensors



Door ELCOCOS

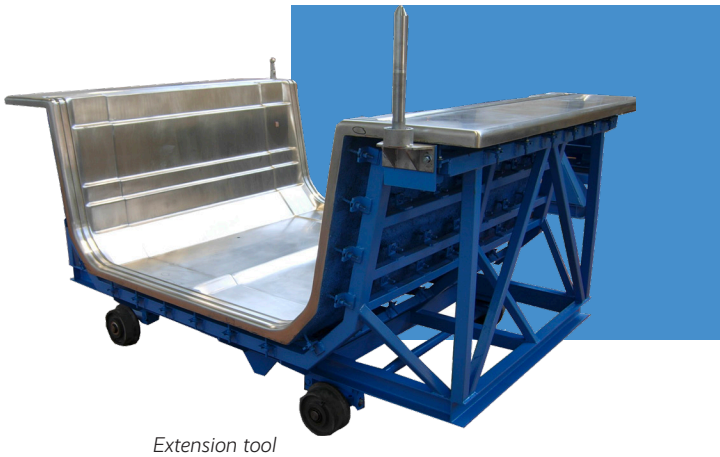
This project has received funding from the Clean Sky 2 Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 831900

5 RTM TOOLS

MOULD TOOLS

RTM tool with nickel skin for polyester parts moulding.

Injection pressure from 1-3 bar with a maximum usable temperature of 100°C (212°F). Nickel tools have a high thermal conductivity, which aids the reduction of the curing cycle to increase productivity.



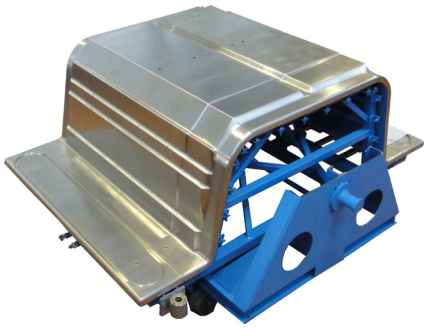
Extension tool
made for EPARCO

MATERIAL

- Nickel thickness from 5 to 8 mm
- Cooper thermal control circuit
- Aluminum filled resin concrete
- Steel frame

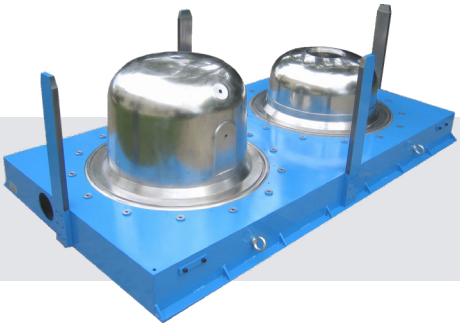
BENEFITS

- Excellent thermal conductivity
- Surface hardness from 15 to 40 HRC
- Light tools
- Corrosion and abrasion resistance
- Mirror polished surface
- Texture reproduction (leather, fabrics...)
- Thermal homogeneity



POSSIBLE OPTIONS

- Thermal regulation
- Vacuum closure
- Tool adaptation for press use



Filter tool
made for PROCOPI

6 SILICONE

INDUSTRIALIZATION

Thanks to our experience and skills base CORIMATEC can provide reusable silicon bags, bladders and caul plates to our customers requirements and technical needs.

TECHNICAL DATA

- Reusable silicone pressure bladders : used for hollow composite parts production
- Reusable silicone vacuum bags : used for composite parts compaction and curing
- Reusable silicone caulplates : used to compress parts to connect thickness
- Silicone parts

BENEFITS

- Costs reduction
- Wastes reduction
- Precise adaptation to part geometry
- No leaks while curing
- Uniform pressure on parts with complex geometry
- Ease of mould cleaning
- Large series production

POSSIBLE OPTIONS

- Self heating bag (180°C / 356°F)
- Integrated temperature sensors
- Local reinforcement
- Addition of a PTFE coating
- Mounting on hinges and gas spring

SILICONE BAG

Silicone bag on gas cylinders
T° max = 200°C / 390°F

AIRBUS Helicopters Membrane
T° max = 250°C / 480°F

SILICONE BLADDER

COMPARAISON For a 1m² mold	SILICONE BAG	TRADITIONAL VACUUM BAGGING	SAVING
LAYUP	50 mins	88 mins	43%
CONSUMABLES (base 100)	56	100	44%
WASTES	0,8 Kg	1,8 Kg	56%

VACUUM TABLES

APPLICATIONS

- Hot pre-forming
- Compacting

BENEFITS

- Increase of productivity
- No manutention costs
- Conform to part shape
- Uniform pressure on complex parts
- Consumables costs reduction

Temperature controller

ISOJET EQUIPEMENTS

7 CAUL PLATES

INDUSTRIALIZATION

Caul plates are used to compress the composite part, especially monolithic area and honeycomb border while curing, to ensure a conforming part quality.

CORIMATEC produce prepreg caul plates in glass and carbon fiber, hybrid with composite and metallic surfaces and hybrid with composite and silicone areas.

TECHNICAL DATA

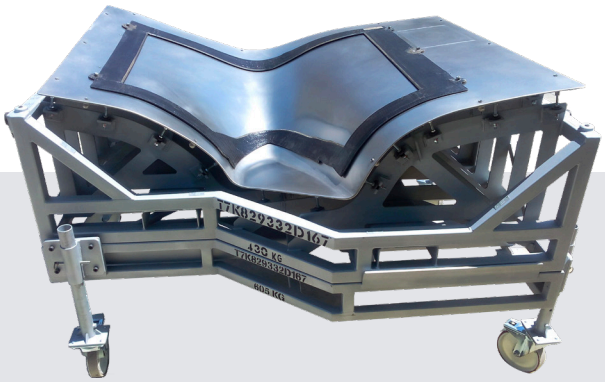
- Low cost masters (5 axes machined) which allow low cost caul plates duplications
- Resistance to 190°C (374°F)

MATERIALS

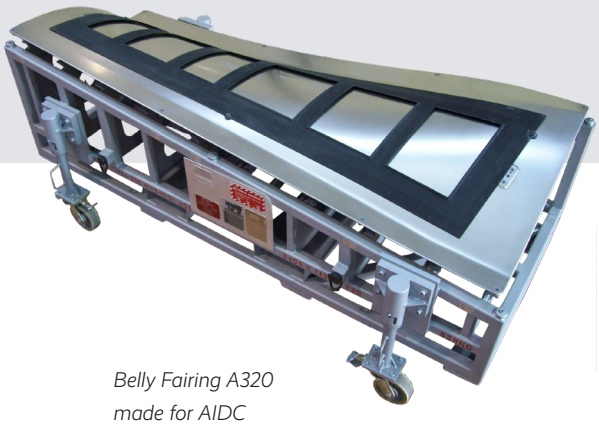
- Prepreg glass fiber / epoxy / BMI
- Prepreg / carbon / epoxy / BMI / other
- Silicone / prepreg
- Nickel / prepreg
- Nickel

BENEFITS

- Productivity
- Repetitiveness
- Reliability
- Easy to use
- Process securing



Filet Fairing A320 made for DAHER



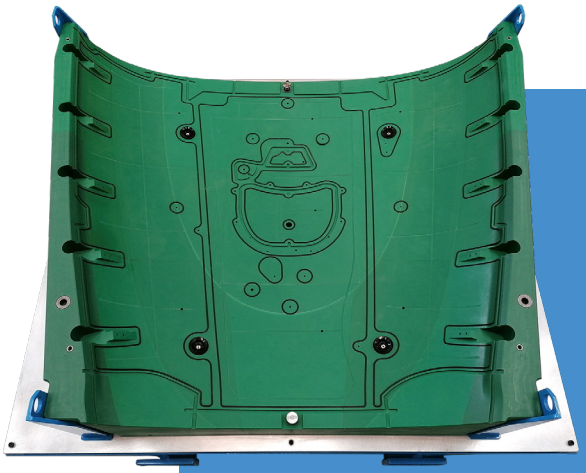
Belly Fairing A320 made for AIDC

Caul plate Nickel / Prepreg

8 TRIMMING TOOLS

INDUSTRIALIZATION

CORIMATEC design and produce trimming tools for CNC and manual trimming.



MATERIAL

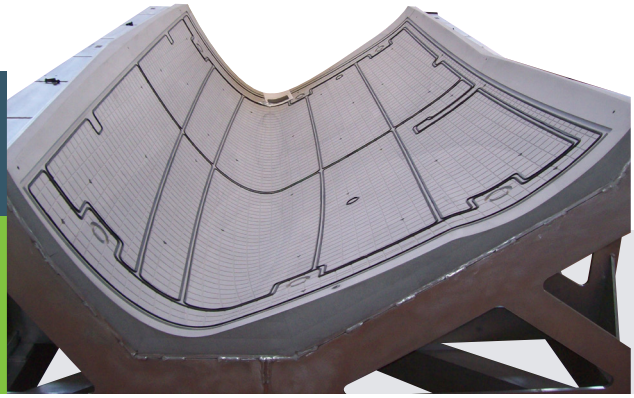
- Steel or aluminum frames
- Polyurethane / epoxy resin
- Composite glass fiber / epoxy

BENEFITS

- Precise part referencing on the tool
- Part position locked by vacuum
- Industrial process

POSSIBLE OPTIONS

- Mechanical clamping
- Positioning guides on CNC table



ISO 9001:2015
BUREAU VERITAS Certification

corimatec