

## The EURO-COMPOSITES® Group

A Global Player from Luxemburg





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**Welcome to EURO-COMPOSITES®**

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**Who we are**

The EURO-COMPOSITES® Group is a global player in the field of advanced and demanding composites products. We service our customers globally from three locations.

We are worldwide one of the leading producers of complex composites parts.

We deliver to our customers just-in-time and in highest quality:

- Ready-to-assemble parts
- Formed and/or milled composites parts
- Panels
- Laminates
- Honeycomb core materials

In order to support and service our customers best according to their needs we organize our business in three units:

- AVIATION
- SPACE
- INDUSTRIAL

**The group**

The EURO-COMPOSITES® group consists of:

EURO-COMPOSITES® S.A.  
Zone Industrielle  
L-6401 Echternach  
Luxemburg  
Phone: +352-729463-1  
Fax: +352-729460



EURO-COMPOSITES® Corporation  
13213 Airpark Drive  
Elkwood, VA 22718  
USA  
Phone: +1-540-727-8500  
Fax: +1-540-829-6611



EURO-COMPOSITES® GmbH  
Dieselstr. 13  
D-54634 Bitburg  
Deutschland  
Phone: +352-729463-1  
Fax: +352-729460



**Site Echternach,  
Luxemburg**



Current building status



Development plan

- Headquarter
- Main production site
- Finished part production
- CNC center
- Panel production
- Honeycomb production from Kevlar®, Nomex®, glass- and carbon-fiber

Total area: 93.000 m<sup>2</sup>  
 whereof production area: 37.500 m<sup>2</sup>

**Site Echternach,  
Luxemburg**

**Center of Excellence  
Research & Development**



- Research & Development Center
- Design and Construction
- Prototyping & Pilot manufacturing
- Development, test and implementation of new materials, processes and production technologies

Total area: 15.400 m<sup>2</sup>  
whereof production area: 2.000 m<sup>2</sup>

**Site Culpeper,  
USA**



Current building status



Development plan

- Production Site
- Finished part production
- CNC-center
- Panel production
- Honeycomb production from Kevlar® and Nomex® fiber

Total area: 48.000 m<sup>2</sup>  
whereof production area: 7.000 m<sup>2</sup>

**Site Bitburg,  
Germany**



Current building status



Development Plan

- Production Site
- Finished part production (RI, RTM and EC-HLM with honeycomb)
- CNC-center for „Clean Core“ aluminum processing
- Aluminum surface treatment
- Honeycomb production from aluminum foil

Total area: 20.000 m<sup>2</sup>  
whereof production area: 3.000 m<sup>2</sup>



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EURO-COMPOSITES®

Company Presentation

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Welcome to EURO-COMPOSITES®

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**Registered Sales Offices**

**EURO-COMPOSITES® ESPAÑA S.L.**

Avda. de Esparta, 57 - 2ºD  
E-28230 Las Rozas - Madrid  
Spain

Phone: +34 (91) 6317616

Fax: +34 (91) 6319959

**EURO-COMPOSITES® UK Ltd.**

Hill Top Farm  
Arkengarthdale  
GB-Richmond, North Yorkshire DL11 6RR  
United Kingdom

Phone: +44 (17 48) 88 47 77

Fax: +44 (17 48) 88 48 88



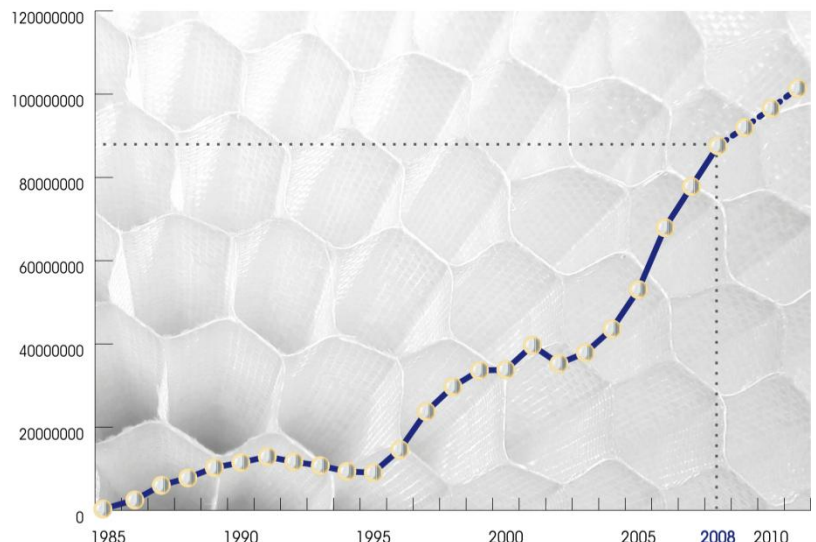
Company History

**The start**

1984 / 1985	Incorporation of EURO-COMPOSITES® S.A. in Echternach
12.08.1985	First honeycomb order by Henshall Bonded Assemblies, UK
31.10.1985	Qualification of honeycombs and of the production site according to LN 29970 by MBB, Messerschmitt-Bölkow-Blohm GmbH
since 1987	Qualification of honeycombs and of the production site by Boeing, USA Qualification of the panel production by Buderus Sell, Germany
24.03.1988	Incorporation of EURO-COMPOSITES® Corporation in Culpeper
since 1988	Continuous development into new markets with a broadened product range and new, high-tech manufacturing technologies
1.01.2006	Incorporation of the production site EURO-COMPOSITES® GmbH, Bitburg, Germany
01.10.2007	Our Center of Excellence resumes work in a separate building
1.03.2009	EC starts on a 2500 m2 production area into the production of assemblies for aircraft interiors (structures like for example Galleys).

**The development**

**EC Group**  
Turnover / Umsatz / Chiffre d'affaire (in €)



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**Company Policy and Quality Philosophy**

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**Quality Philosophy**

Advanced composites is our business. EURO-COMPOSITES® combines classic and innovative materials and technologies to create new products, which are designed in close cooperation with our customers and according to their needs.

Our goal is to gain customers as partners on a global basis. Our clients come from a multitude of industries. Therefore we at EURO-COMPOSITES® listen to our customers in order to learn how to serve their needs by applying analogous solutions to provide the products that exactly fit their requirements at the lowest possible cost.

EURO-COMPOSITES® will deliver to its customers or prospective customers products and services that conform exactly to their requirements. This obliges us to design our manufacturing, marketing, technical and administrative processes to prevent deviations and to perform all operating and staff functions right the first time.

Safety and environmental concerns are our first priorities.

**Market development**

- **SPACE**  
Goal: To introduce the technological potential of EURO-COMPOSITES® into other markets.  
  
The membership in GLAE (Groupement Luxembourgeois de l'Aéronautique et de l'Espace) allows us to intensify our contacts with the space industry and especially with ESA.
- **AVIATION**  
With the accreditation according to „EASA 21 Part G" we are permitted to produce finished parts and certify them ourselves as airworthy. The next consequential step will be the accreditation according to „EASA 21 Part J" in order to design such parts on our own responsibility. Then we will be able to supply the European aviation industry, with products on all levels.
- **INDUSTRIAL**  
Increase market share for train interiors: By offering the planning and production of the complete train interior as a package EURO-COMPOSITES® satisfies the customer's demand for system suppliers.

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**Company Policy and Quality Philosophy**

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**Management principles**

- High degree of self-responsibility (Internal Entrepreneurship)
- Functional, rule-based organization system with self-regulating character
- Internal coordination by regular, cross-functional panels and ad-hoc working groups
- Employee meetings with very extensive information
- Speeches of external experts for the information and motivation of the employees
- Employee suggestion system (Gratification: 10% of benefit)
- Continuous information about market and company data for the improvement of a positive work climate

**Organization**

- Consequent alignment of human resources towards the different market needs of AVIATION, SPACE and INDUSTRIAL segments.

Starting from top management level down to the operative units there is a rigorous differentiation between AVIATION, SPACE and INDUSTRIAL segments.

- Controlling, MTM, Barcode  
Goal: optimize cost transparency and control for materials and production processes.

MTM, an internationally acknowledged method for production time determination and planning, together with a package of other measures, will guarantee a better utilization of all resources. MTM is also used by companies like Airbus, Audi, BMW, Daimler Chrysler as well as all important suppliers of the automotive industry.

For his efforts and merits with the development of the MTM methods an employee of EURO-COMPOSITES® has been awarded by the German MTM Association with the "MTM Fellow 2006".

- Document management system with integrated Workflow  
Management of three closely interlocked production sites with demanding quality management systems and the vision of the „entrepreneurial employee" make an advanced document management system with a partial workflow control a necessity.

Key Data and Financial Information

**Key Figures  
EC Group**

Capital & Reserves	€	34.933 Million
Subscribed Capital:	€	20.160 Million
Legal and other reserves:	€	14.773 Million

Investment	€	118,00 Million
Rating by banks		BBB to BBB+

Employees		686 (average age 39 years)
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Production area	EURO-COMPOSITES® Group	49.5000 m <sup>2</sup>
Total area	EURO-COMPOSITES® Group	176.400 m <sup>2</sup>

Important Qualifications		Airbus Group Boeing D1-4426 EASA 21 Part G ISO 9001 & SAE AS 9100 NADCAP
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**Financial data  
EURO-COMPOSITES® Group  
2008**

Ratio of Equity		$\frac{\text{Equity}}{\text{Total Assets}} = 42.2\%$
EBITDA		€ 15.5 Million

**Turnover  
EURO-COMPOSITES® Group**

2008		€ 87.6 Million
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**AVIATION**

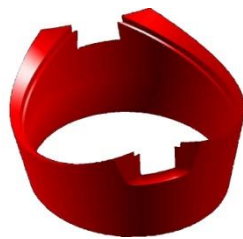
Commercial aviation industry worldwide (interiors, galleys, wing parts, engine cowlings)



Boeing 787



Airbus A380



Engine cowling



Lavatories



Interior work

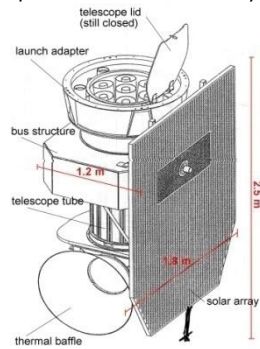


Crew Rest Container

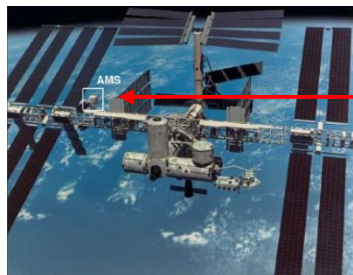


Galley

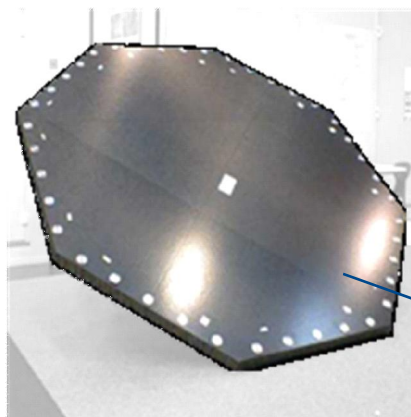
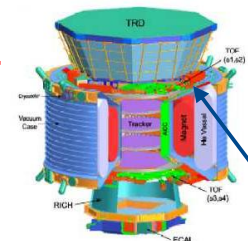
**SPACE** Support panels for solar arrays and other equipment



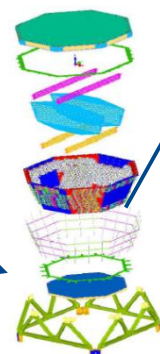
Support panel for solar array



International Space Station (ISS)



Lower TRD platform



**DEFENSE TECHNOLOGY**

**Aerial**

Parts and processed honeycombs for defense projects (JSF, Eurofighter 2000, SAAB Gripen, Tiger, NH-90, A400 M)



Eurofighter



Joint Strike Fighter (JSF)



Tiger



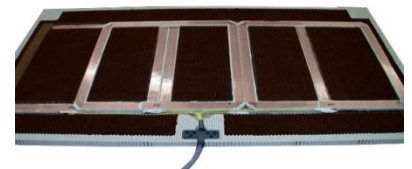
A400 M

**Naval and Ground-Based**

- Structural components and sandwich constructions for radar/ antenna systems and radomes
- Projection walls, structural applications and corpus constructions for simulators
- Drop pallets for parachute systems and transport pallets
- Transport boxes and composite structures for weapon systems
- Shelter-systems and mobile lightweight container
- Ballistic protection panels



Radar system



Detector panel



Drop pallet (Detail)

**RAIL** Railroad industry: interior furnishing and structural parts

- High Speed Trains
- Double deck wagons
- Long distance trains
- Urban trains and metros



Double deck wagon with self-supported intermediate floor (2.61 x 15.46 m), aluminum construction



Double deck wagon with self-supported intermediate floor (2.64 x 8.09 m), steel construction



Roof made with an aluminum honeycomb construction



Pre-finished roof panel including fixation points for infrastructure and protection against burn-in from sparks (Dimensions: 2.41 x 10.34 m)



Interior parts: Ceiling and maintenance hatches, partition walls, floor panels, stairway parts, access ramps, etc.



**MECHANICAL  
ENGINEERING**

- Machine building: fast moving working tables, projection screens, vacuum tables
- Elevators: interior parts for cabins
- Complex panels for research institutes



Plotter- and Cutter units with vacuum tables in honey-comb technology



Vacuum table (detail view)



Working table for a laser cutting unit



High precision measuring plan table



Working table for large format printers



Tracker panel for research institute

**ROAD**

- **Commercial vehicles**

Truck superstructures, parts for busses and fire engines. Superstructures for security trucks, show- and exhibition- trucks

- **Passenger transport:**

Enhanced automobile safety with machined parts (crash absorbers) in bumpers and the car interior, crash barriers for safety tests, access ramps



Aluminum honeycomb as collision protection in the head area



Access ramp for a passenger transport vehicle



Pre-finished crew cabin for a fire fighting vehicle

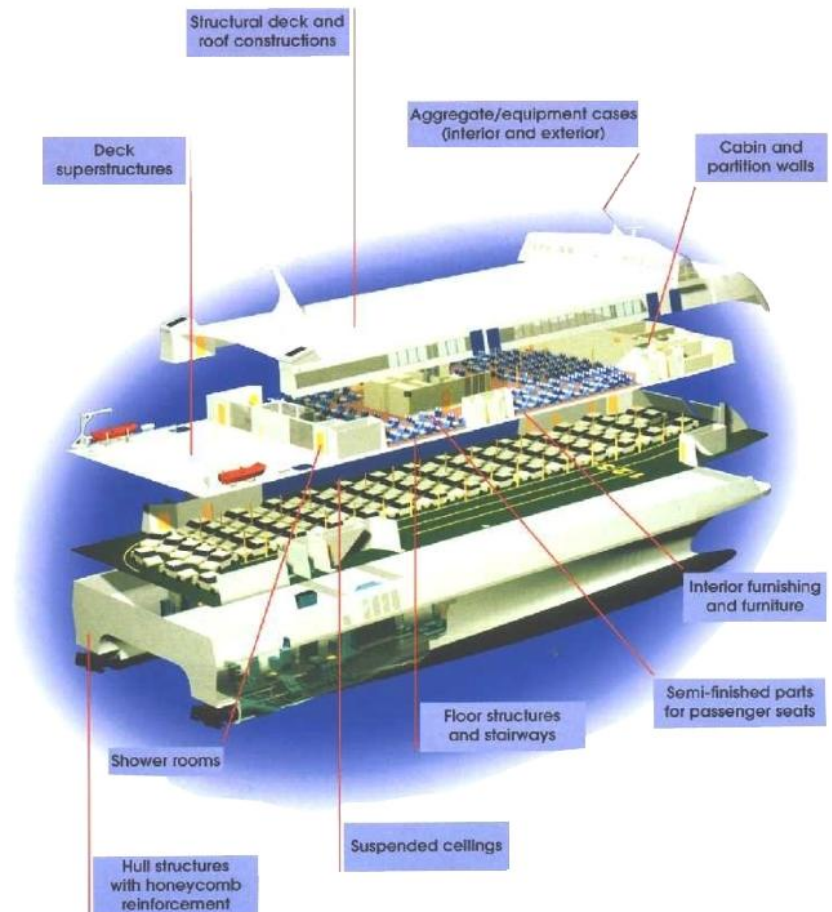


Panels up to 15,0 m length for truck superstructures



**SHIP**

- Boat building  
Interior and structural parts for racing and sport boats as well as for luxury yachts
- Shipbuilding  
Partitions and cabin walls. Roof and flooring parts for high-speed ferries and ships



Applications in shipbuilding



Roof construction made from 1,20 x 10,00 m Panels



Racing yacht with honeycomb hull

**TRADE & PROCESSING**

- Sport industry: core material for skis, snowboards and surf boards
- Building industry:
- General: Sales of standard honeycombs and panels to processors and traders



Globally active: Our customers and we

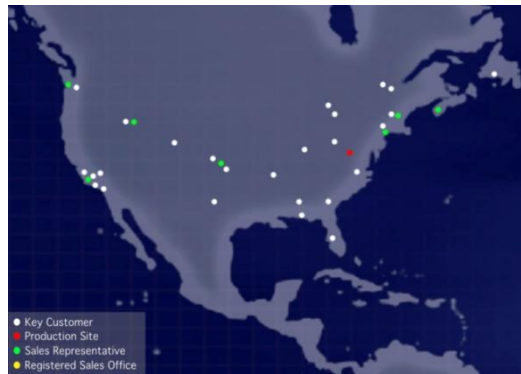
**Europe, North Africa, Near East**



Top-Customers

- Airbus-Group
- Aircelle
- Alstom
- BAe Systems
- Bombardier Group
- Daher Lhotellier Aerotechnologies
- Dasell
- FACC
- ICSA
- Israel Aircraft Industries
- Lufthansa Technik
- SACESA
- Sell
- Siemens
- Thales
- Vemina Aviaprestige
- Tulpar Interior

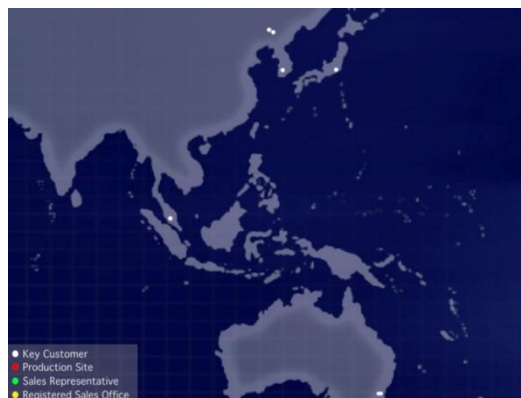
**America**



Top-Customers

- Aim Aviation
- Bell Helicopter Textron
- Boeing Group
- Bombardier Group
- GE Aircraft Engines
- GKN Aerospace
- Lockheed Martin
- Northrop Grumman
- Utd. Technology Sikorsky Aircraft
- Spirit Aerosystems

**Asia**



Top-Customers

- CRC Changchun Rail
- CTRM Aero-Composites Technologies, Malaysia
- EDI Rail, Australia
- Fuji, Japan
- Korean Air

**Preassemblies**

- Final assembly of complete units
- Design and manufacturing of composites parts and selection of suppliers for add-on parts
- Product qualification



Defense technology, mobile container



Train floor completely finished for assembly into the train



Production and assembly of a cabin for a fire engine



Detail of an assembly for aircraft interiors (complete base structure done by EC)



Detail of an assembly for aircraft interiors (complete base structure done by EC)



Detail of an assembly for aircraft interiors (complete base structure done by EC)

Our products

**Finished Parts**

- Completion of drop-in parts (inserts, reinforcements, extruded profiles, priming, grinding, coating)
- Design and manufacturing of tools and molds from metal and reinforced plastic
- Prepreg hand lay-up



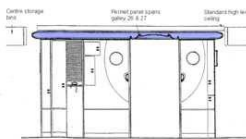
Pelmet (1.80 x 3.50 m) ceiling part



Part detail with edge closure, inserts and reinforcement laminate



Drop-in parts after final control



Installation layout Pelmet

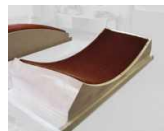


Stairhouse shown as part and in its final assembly state (right)



**Formed/Machined Parts**

- Design and manufacturing of heat-forming equipment
- Manual and machined processing of honeycomb and parts
- Cold and hot forming of honeycomb parts and sandwich structures (two heat forming ovens)



Heat-formed, machined honeycombs on their inspection tool



Heat-forming of Honeycombs



lightweight tooling with honeycomb part



Radome made from formed honeycomb core details



Machining of honeycomb



Core detail formed and machined from two sides

**Design and production of molds and tools**

The experience of EC in the design and production of molds and tools for our own production needs is more and more used by our customers too:

- Tools and fixtures of all kinds
- Molds for honeycomb contouring and forming as well as for design model making
- Molds for sandwich parts and honeycomb stabilization (for RI process, oven and autoclave curing)



Wooden fixture tool



Sandwich part tool for oven curing at 135°C



Metal mold for oven or autoclave curing



Polyurethane (PU) tool as a CNC milling fixture



Steel tool for honeycomb heat forming



Tool produced with RI for the contouring of formed honeycomb core details



Coated PU tool for model making



RI-mold for parts made with oven or autoclave curing



RTM light mold

**New concept for tool production: EC-Tool**

Production of tools and molds on the basis of honeycomb sheets and pastes

- Weight, time and cost reduction compared to conventional mold making
- High-tensile mold construction with an excellent surface quality and vacuum tightness



Bonding of honeycomb sheets with paste



Rough milling of contour



Application of paste on the blank mold



Finished mold after final milling



Our Products

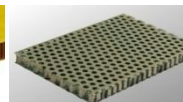
**Panels**



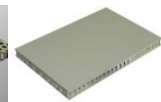
Nomex honeycomb  
Carbon Skins



Nomex honeycomb  
Glass/Phenolic skins



Aluminum honeycomb  
perforated aluminum skin



Aluminum honeycomb  
Aluminum skin



Special fiber honeycomb  
MDF sheet

An almost inexhaustible plenitude of combinations of core material, skin material and adhesives. EURO-COMPOSITES® designs according to customers requirements the best-suited panel for the application and processing situation.

Possible parameters for the panel design are for example:

- Weight and stiffness specifications
- Fire, smoke and toxicity (FST) requirements
- Behavior in aggressive or corrosive environments
- Temperature resistance

**Laminates**



No matter what material: woven or any type of non-woven material: EURO-COMPOSITES® combines for the customer fiber materials and resin and manufactures small and large format laminates with the optimum, cost-effective production technology.

**Honeycomb core materials**



Nomex honeycomb  
Kevlar honeycomb



Glass fiber honeycomb



Carbon honeycomb



Aluminum Honeycomb in alloy 3003 and 5052



Perforated Honeycomb from Aramid

EURO-COMPOSITES® manufactures honeycomb core materials from a great variety of raw materials and in a large programme of cell sizes and densities.

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## New products – research and development

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### New honeycomb generations

With our new honeycomb types we do go along with the new airplane generations of our customers.

#### New products available for our customers:

- Kevlar® honeycomb
- Glass fiber honeycomb
- Aluminum honeycomb in alloy 5052 with a Cr-free corrosion protection
- Carbon fiber honeycomb

#### In Development:

- Carbon fiber honeycomb (further development)
- Aluminum surface treatment on aviation and space industry levels
- Kevlar® honeycomb (further development)
- Glas fiber honeycomb (further development)

### Development projects



#### Chrome-free 5052 and 3003 Aluminum Honeycomb Core (improved corrosion resistance)

Completely chrome-free coated honeycomb with an improved corrosion protection suitable for all aeronautical and space applications (alloy 5052) and commercial applications (alloy 3003)



#### Glass fiber honeycomb core

Our goal to offer the market a reliable source for this core type has been achieved. Now we want to develop core with increased mechanical strength, reduced weight and smaller cell sizes.



#### Carbon fiber honeycomb/

#### Kevlar® fiber honeycomb

We are doing research on these products in order to achieve increased mechanical strength and modified physical properties (i.e. electrical conductivity)

#### Resin development with nano-particles

We modify resins with nano-particles to get better mechanical and impact properties, improved thermal and electrical conductivity values and to meet FST requirements, e.g. Railroad specification NFF 16-101 (M1/F1).

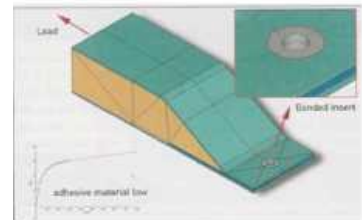
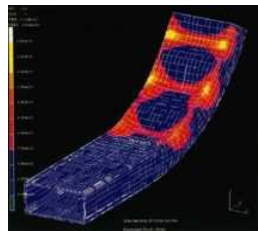
New products – research and development

**Development projects**

(continued)

**Fatigue Behavior**

- Fatigue behavior of light weight structures based on honeycomb core. (Cooperation with Luxembourgian research institutes)
- Simulation of honeycomb structures for different loading cases (static and dynamic)



**Sandwich panels with high impact strength**

EC follows two path of improvement: Improved resins systems and stronger materials for the honeycomb cell.

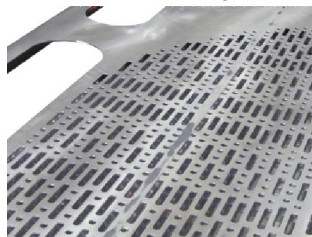
**Sandwich panels with magnesium skins**

Together with industrial partners EC aims to reduce the weight of metallic sandwich constructions even further, while at the same time providing a good corrosion protection.

**EC-HLM process development**

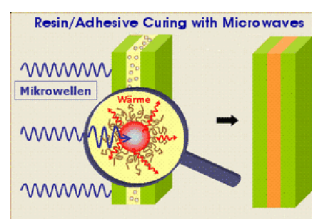
EC Honeycomb liquid molding (EC-HLM) is already a usable process technology. Our current aim is to find more usable resin systems. With this research we want to broaden the range of possible applications.

**Friction Stir welding (FSW)**



A technology that is already in use for industrial production at EC, but is nevertheless constantly developed further in order to find new applications.

**Resin curing with Microwave technology**



Development goal for this project is the reduction of production cost, a more ecological production process (different resins system with a reduced solvent content) and a better control of the product properties during the production process.

**General Qualifications**

Quality Systems

ISO 9001 – 2000  
NADCAP COMPOSITES  
AS 9100  
Qualifas/AECMA EASE  
EASA 21 G

**Qualifications by customers**

AUSTRIA	FACC	FMS 1030 FMS 3210
BRAZIL	Embraer	MEP 15-010 MEP 15-030
FRANCE	Adder Aircraft Interiors Aérospatiale Aérofonctions s.a.s. Aircelle	PGQ 34-1608 ASN-B 75310/75320 DQ 16 BLGG 502001/BLGG 502101 HDSM 1045/1044
	Breguet Aviation Dassault EADS Astrium	27161/NSN-B 75310 AMD.BA 1.4.2.3.4 DSN 0798 01 AA
GERMANY	Airbus	AIMS 11-01-001 AIMS 11-01-004 AIMS 11-01-005 AIMS 11-01-007 AIMS 11-01-008
	Sell GmbH Dasell Cabin Interior GmbH EADS Dornier GmbH EADS Airbus GmbH	WO 303-001/WO 306-001 DCIN 100 DOL 70/DOL 71 IPS 11-01-001-01 IPS 11-01-004-02
	Luft & Raumfahrt	LN29967 LN29968
INDONESIA	IPTN	NMS 8-124
ISRAEL	Israel Aircraft Industries	M.S. 08.0020
ITALY	Agusta Alenia	199-24-103 N4901
NETHERLANDS	Stork Fokker Driessen Aerospace Systems	THS.472/THS.473 SMS 015
SPAIN	Aries C.A.S.A.	ACMS233 I+D+P-176
SWEDEN	Saab Aircraft AB	STD 124224/226/228
SWITZERLAND	Bucher Leichtbau AG Jet-Aviation Basel AG	div. LAM Spec. curved Panels
UNITED KINGDOM	AIM Group BAe Airbus BAE Systems Ericsson Microwave Systems Marconi Radar Systems Ltd. Bombardier - Shorts GKN Westland Aerospace	BAER 1007 ABR 3-0070/0069/0066 MM-0032 10549MPP247 06CL0061/319/T308 SMS35 WHPS 297

**Qualifications  
by customers**  
(continued)

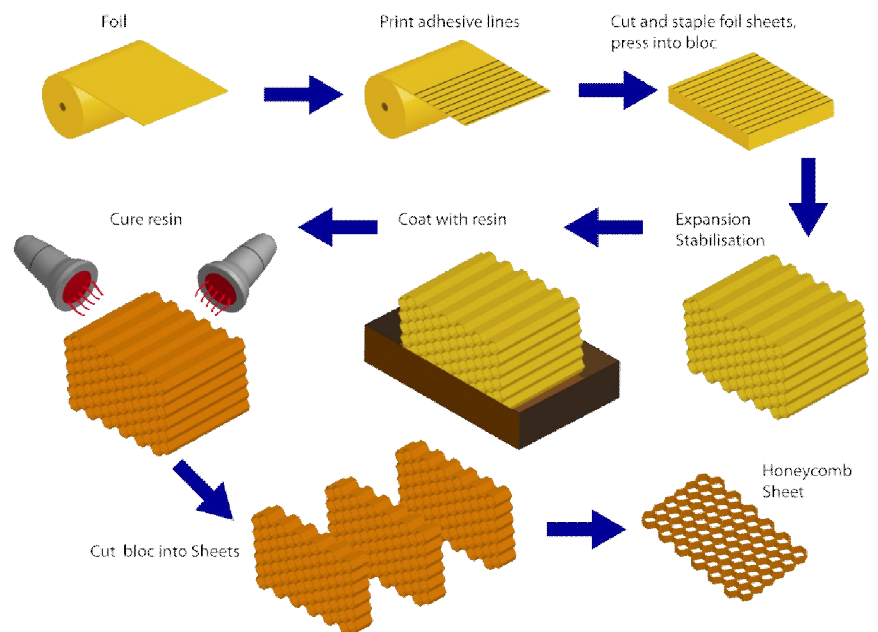
USA/CANADA	AAR Composites	ATRMS 301
	AIM Composites Ltd.	AIM-M-1013
	Bell Helicopters Textron	299-947-103
	Boeing	BMS 8-124
		BAC 5317
		D210-12012
	Bombardier Canadair	BACM 539-001
	Bombardier de Havilland	D H M S - P1.26
	Heathtecna	EPS No 1009
	Cessna Aircraft Company	CMNP083
	Composites solutions Corp.	CSCMS220
	General Electric	A50TF 86
	BF Goodrich Aerospace	RMS 065
	Gulfstream Aerospace Corp.	GMS 4011
	Kaman Aerospace Corp.	KPS 384
		KPS 922
	Lockheed	LCM 28-1041
		STM 28-105
	Lockheed-Martin	LMA-MD017
	Mc Donnell Douglas	DMS 1974
Nordam Group	NTR-MS 3031	
Northrop Grumman	ACS-MRS-5301	
Raytheon Aircraft Corp.	BS 23732	
Rockwell International Corp.	TB 0130-035	
SAE	AMS 3715	
	AMS 3711/3714	
	AMS-C-81986	
Sikorsky Aircraft	SS 9223	
TTF Aerospace	TMS13	

Infrastructure and production technologies

**Honeycomb production and sawing**

EURO-COMPOSITES® has four production lines for the aramid honeycomb production and another line for the production of aluminum honeycomb.

- Two printer lines for Nomex®, Kevlar® and one for aluminum
- Simultaneous lay-up of 6 blocks with automatic machines plus resources for hand lay-up in case of production peaks
- One 5-opening-block-press, two 3-opening-block-presses
- Five dip tanks
- Four stabilization ovens
- Nine curing ovens
- Fifteen aramid honeycomb saws and two aluminum honeycomb saws



Production process for aramid honeycomb

Infrastructure and production technologies

**CNC milling center**

Capable to machine metal, plastics, wood, foams, honeycomb, laminates and parts made of GRP, CRP, and ARP

Machine	Working axis	Machinable dimensions		
CNC 1	Five	2500	x	1200 x 600 mm
CNC 2	Five	2500	x	5000 x 600 mm
CNC 3	Five	1100	x	1000 x 400 mm
CNC 4	Three	2200	x	4200 x 300 mm
CNC 5	Five	2500	x	1200 x 400 mm
CNC 6	Five	2500	x	1200 x 400 mm
CNC 7	Five	2100	x	5300 x 950 mm
CNC 8	Five	3200	x	11500 x 500 mm
CNC 9	Five	3000	x	15000 x 1000 mm
CNC 10	Five	4050	x	2050 x 1000 mm
CNC 11	Five	7100	x	1440 x 860 mm
CNC 12	Five	1840	x	4100 x 800 mm
CNC 13	Five	1840	x	5200 x 800 mm
CNC 14	Five	2020	x	4100 x 860 mm
CNC 15	Five	7000	x	1440 x 820 mm
CNC 16	Five	3360	x	1340 x 300 mm
CNC 17	Five	4800	x	8000 x 2000 mm
CNC 18	Five	6500	x	2600 x 1300 mm
CNC 19	Five	5500	x	2600 x 1300 mm

CNC 16 is an ultrasonic cutting machine  
 CNC 17 is dedicated to milling monolithic carbon parts



Milling of a part



Modern, powerful CNC Milling centers

### CAD/CAM

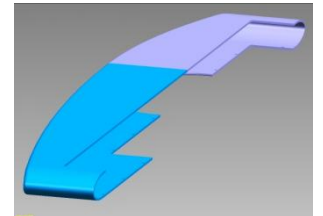
#### CAD-Software:

- Unigraphics NX2 and NX4
- CATIA V5 R17
- AutoCAD 2008



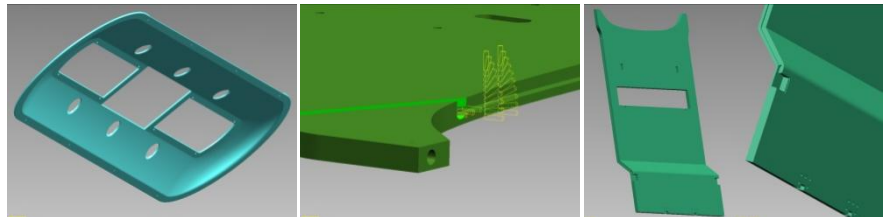
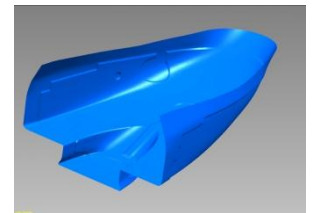
#### CAM-Software

- Unigraphics NX4
- 3- and 5-axis programming
- UNISIM simulation software



#### Data Exchange via:

- Unigraphics or Catia, Native Formats
- STEP, Parasolid, Iges, for the 3D-area
- DXF, PDF, CGM for drawings and the 2D-area





Infrastructure and production technologies

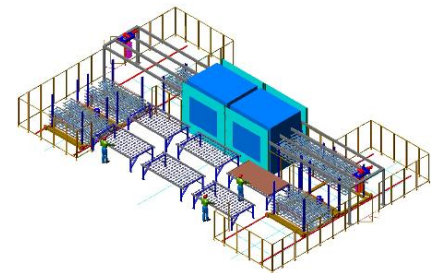
**Panel Production**

On our modern presses we manufacture panels and parts with all established core materials and skins of prepreg, aluminum or laminates (HPL and CPL).

Press	Openings	Maximum panel dimensions
Press 1	4	2400 x 2950 mm
Press 2	3	1300 x 3000 mm
Press 3	3	1360 x 3150 mm
Press 4	2	2100 x 4000 mm
Press 5	1	2500 x 12000 mm
Press 6	1	3000 x 15000 mm
Press 7	1	1300 x 2700 mm
Press 8	1	1335 x 3000 mm
Press 9	1	1300 x 2500 mm
Press 10	1	1100 x 2500 mm
Press 11	2 x 5	1650 x 3200 mm
Press 12	1	1350 X 3600 mm
Press 13	1	1350 X 3600 mm
Press 14	1	1350 X 3600 mm



Press for large formats



5 opening hot/cold press with feeding infrastructure

Infrastructure and production technologies

**Automatic Potting machine**

- Machine concept by EURO-COMPOSITES®
- Fully automatic NC-controlled potting machine
- Laser-positioning system
- Maximum part dimensions: 2000 x 4000 mm
- Fast and efficient potting of honeycomb parts with complex shapes
- Nesting software to optimize material usage



**Coating line**

- Maximum part dimensions: 3100 x 5200 mm
- Air temperature for drying continuously adjustable up to 120°C
- Able to process all coating systems for high-pressure airbrushing.

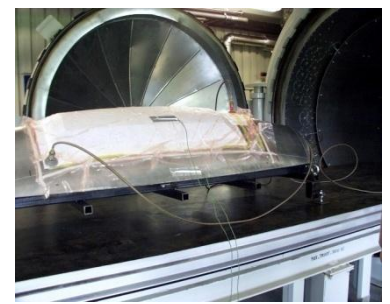


**Autoclave**

- Maximum dimension for parts: 2000 x 6000 mm
- Curing temperature 180°C (Standard), up to a maximum of 250°C
- 6 bar pressure
- 24 point vacuum measuring system



View of the EURO-COMPOSITES® autoclave



Part prepared for autoclave process

Infrastructure and production technologies

**Friction Stir Welding**

Friction Stir Welding (FSW) joins two parts with a specially shaped, rotating tool.

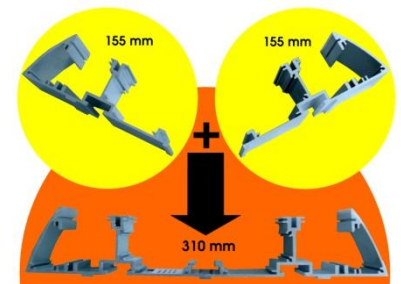
Due to rotation and pressure of the tool frictional heat is produced and the parts soften plastically in the area of the rotating tool without reaching the melting point.

The pin of the tool immerses into the malleable material of the parts and produces by its rotation and shape a homogenous blend along the joining line. The shoulder of the tool forms and smoothes the welding line with only a marginal ridge.

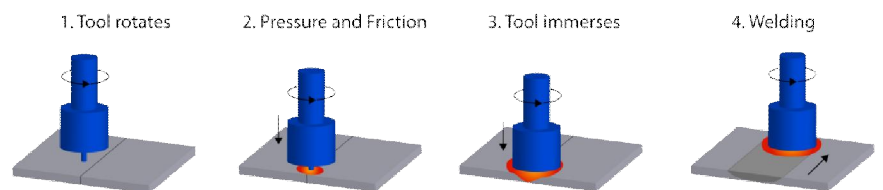
After cooling there is a solid phase joint of the two parts. The process does not need filler wire, welding flux or gas shielding and produces a sealed weld without porosity and without inclusions.



Double-head welding unit



Extruded Profiles extension with FSW



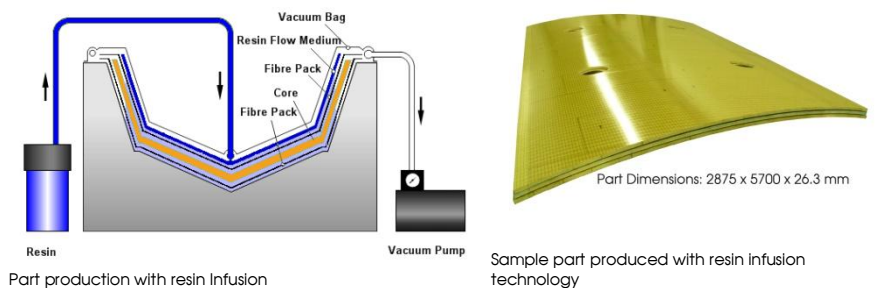
Work flow of the FSW process

EURO-COMPOSITES® uses a **very modern double-head welding unit** which is especially suited for the joining of extruded profiles:

- Maximum dimension for parts: 3000 x 18000 mm
- Maximum dimension for single extruded profile: 500 x 3300 mm resp. 500 x 6000 mm with repositioning
- Maximum distance between upper and lower welding tool: 420 mm
- Maximum welding line thickness (full material, both heads welding simultaneously):
  - 10 mm (in AA5xxx and AA2xxx),
  - 18 mm (in AA6xxx)

Infrastructure and production technologies

**Resin Infusion (RI)**

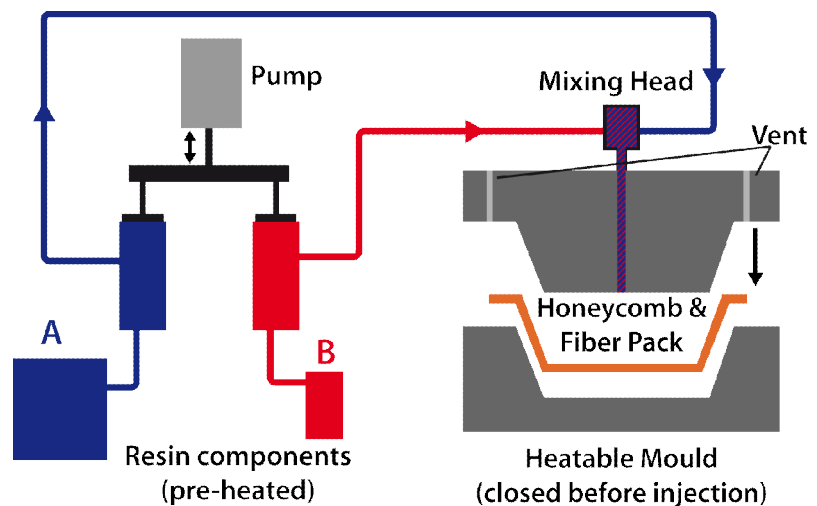


Part production with resin Infusion

Sample part produced with resin Infusion technology

Useful technology for flat parts and laminates up to relatively complex shaped parts with one visible surface. EURO-COMPOSITES® uses various vacuum techniques with mold and vacuum foil as counter-mold. These processes are best suited for small to medium size series.

**Resin Transfer Molding (RTM)**



Manufacturing of a part using the resin transfer molding process

For larger series or double-sided decorative surfaces the Resin Transfer-Molding (RTM) process is well suited. Massive closed mold and counter-mold system are used as the resin is introduced under pressure into the mold system.

Infrastructure and production technologies

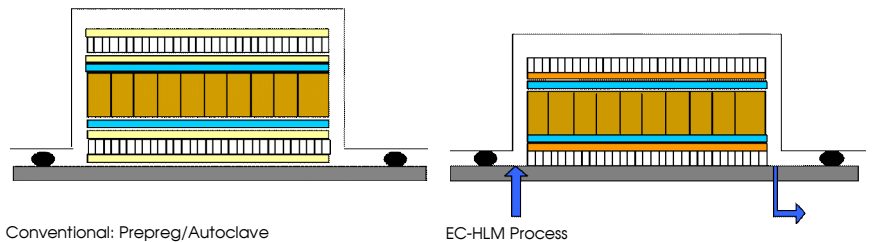
**EURO-COMPOSITES®  
Honeycomb liquid  
molding (EC-HLM)**

Advanced parts with a honeycomb core have been manufactured (especially in the aviation industry) so far by using the prepreg-autoclave process.

EURO-COMPOSITES® has developed a new process technology that allows the use of honeycomb and dry woven or non-woven fiber packs together with a RI or RTM process.



Structural part with honeycomb core and carbon skins



Conventional: Prepreg/Autoclave

EC-HLM Process

A process comparison for the production of a structural part with similar product properties results in the following advantages for the EC resin infusion process:

- Reduced material cost (dry fabric and pure resin instead of prepregs; less adhesive layers)
- Reduced weight since less adhesive films by 10-15%
- Lower process cost, time reduction by 30%
- Reduced outgoing inspection cost because of improved water tightness (does not need to be controlled anymore)
- Improved operation features (minimized porosity), therefore less water condensation problems into the honeycomb

Infrastructure and production technologies

**Laboratory Service**

Instruments

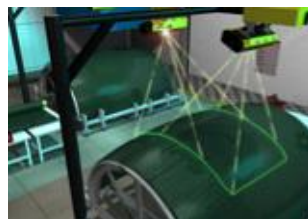
- Universal testing machine (2.5 kN, 50 kN and 100 kN)
- Climate chambers
- Salt spray chamber
- Differential scanning calorimetry (DSC)
- Titro-processing
- Smoke density measurement
- Burning chamber, flammability testing
- Food cart roller test machine
- Coordinate measurement machines (CMM)
- NDT: Woodpecker, tap hammer, ultra-sonic
- NDT: X-Ray unit (6000 x 2500 x 1200mm)
- Laser projection



Universal testing machine



Test of compression strength



Laser Tracker



Coordinate measurement machine



Tap hammer

Employees and qualification level

**EURO-COMPOSITES® S.A.**  
**EURO-COMPOSITES® GmbH**

**Employees by Department**

Sales		22
Administration		25
Procurement		8
Technical Controlling/Production Planning		17
Technical Department		58
Research & Development	8	
Design & Engineering	39	
Process & Industrial Engineering	6	
Prototyping & Pilot manufacturing	5	
Production		365
Workshops, Goods Receiving, Shipping Dept.		76
Quality Department		23
Quality Assurance	5	
Quality Control	18	
Apprentices		13
<b>TOTAL</b>		<b>607</b>

**Employees by Qualification level**

PhD Level		5
Graduate Engineer		45
Business Administration (University degree)		6
State-certified Technician		27
Master Craftsman		37
Skilled Craftsman, Commercial Employee		474
Apprentices		13
<b>TOTAL</b>		<b>607</b>

Employees and qualification level

**EURO-COMPOSITES®  
Corporation**

**Employees by Department**

Sales		8
Administration		6
Procurement		2
Technical Controlling/Production Planning		3
Technical Department		5
Production		41
Workshops, Goods Receiving, Shipping Dept.		8
Quality Department		6
Quality Assurance	1	
Quality Control	5	
<b>TOTAL</b>		<b>79</b>

**Employees by Qualification level**

Graduate Engineer		7
Business Administration (University degree)		2
Technician		7
Master Craftsman		17
Skilled Craftsman, Commercial Employee		46
<b>TOTAL</b>		<b>79</b>





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