



# France: Composites Market

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## SUMMARY

Composite materials emerged over a century ago and continue to be developed into a variety of new forms today. The variable nature of composites, with their vast range of applications, has led to the development of thousands of different products. Composites contain several advantageous characteristics that make them a practical choice for manufacturers across an array of disparate industries. For instance, composites are four times lighter than steel and five times lighter than aluminum. This quality makes composites a key component for auto manufacturers and aircraft assemblers, as a reduction in weight can improve performance and result in significant savings in fuel costs. Additionally, by enabling complex shape design, composites can reduce the number of pieces needed to make a component, resulting in a savings in time and a reduction in the overall cost of production. Though composites can be used for a myriad of applications, they are particularly important to the transportation, defense, aerospace, construction, and wind energy industries.

## PRICE DRIVERS

Glass, resins and carbons are the three main price drivers in the composite market, as each of these are used in the production of composites. As resin is derived from crude oil, the price of resin is sensitive to fluctuations in the global oil market. Based on this fact, the price of resin is expected to increase by 6% per year from 2010 to 2015. In contrast, the price of glass is expected to remain relatively flat with an increase between 0% and 1% between 2010 and 2015. As for carbon fiber, its price is correlated to the price of electricity, due to its required heating process. Consequently, carbon prices should decrease slightly (-1% per year) until 2015.

## MARKET OVERVIEW

Europe represents 25% of the global composites industry, valued at 17 billion Euros and accounting for 22% of total volume, reaching 1.7 million tons. Europe is ranked third after Asia Pacific (26 billion Euros and 3.5 million tons) and North America (25 billion Euros and 2.7 million tons).

France produced 0.3 million tons of composites in 2010 (latest figures available), reaching 2 billion Euros, which represented 15% of the European composites market. Between 500 and 550 French companies are specialized in composites and employ 20,000 people. 80% of those 500 companies are SMEs.

France is preparing itself for the next challenge that the composites industry will face in the future – a transformation towards a mass production approach and a focus on renewable composites. France is developing significant expertise in flax composites with companies such as EcoTechnil, Dehondt, Arkema, Clextral, Dedienné and Terre de Lin as well as public institutions (Institut Technique du Lin) working on the development of flax fiber and bio-composites to be applied in different sectors.

The heaviest users within the French composite industry can be broken down into the following categories:

1) Transportation:

The transportation sector, and more specifically the automotive sector, accounts for the largest portion of the French composite industry with 32% of total composites consumption in France. **Renault** and **PSA Peugeot Citroen** are the two major car manufacturers, while **Alstom** specializes in railroad production including global rail systems, maintenance equipment, and transport infrastructure and signalling. Within the transportation sector, lightweight construction is a major focus and contributes to the growth of the composite industry. In addition, thermoplastics are the most commonly used polymers within the automotive category.

The largest composite processors are linked to the automotive industries. Three prominent Tier I suppliers are **Inoplast [Plastic Ominum]**, **Faurecia** and **Sotira**. These companies produce a range of composite parts for both the interior and exterior of automobiles. At this time, there is a slight trend towards increased composite use in automobile manufacturing.

2) Building and Construction:

The building and construction industry represents 21% of French consumption of composites. The three biggest players in construction are **Vinci**, **Eiffage**, and **Bouygues Construction**. These companies specialize in the construction of civil and energy works, as well as transportation structures such as tunnels.

3) Energy and Electricity:

This sector accounts for 15% for the French consumption of composites. EDF is a leader in the energy market. The company is involved in power generation, electricity and gas supply. EDF Energies Nouvelles, an EDF subsidiary, develops, builds, and operates power generation facilities using renewable energies.

4) Consumer Goods:

Companies such as Rossignol and Salomon account for 10% of French composite consumption, which focuses on the design of winter sports such as skis, bindings, ski boots (Alpine and Nordic), snowboards, technical equipment and soft goods, as well as running and racing.

5) Wind Energy:

The wind energy industry accounts for 7% of French composite consumption. **Gamesa** is a major manufacturer of windmill blades. This company has two commercial offices in France (Lyon and Paris), in addition to managing multiple wind farms throughout the country. In addition, Vestas and GE Wind are two wind energy companies considered to be top consumers of French composite material.

6) Pipes and Tanks:

Pipes and tanks represent 7% of total consumption of French composites. Two large enterprises, the **Total Group** and **GDF-Suez**, dominate the pipes and tanks sector. GDF-Suez specializes in natural gas exploration and production, as well as hydro and wind electricity production, while the Total Group engages in all aspects of the petroleum industry.

#### 7) Marine:

4% of the French composite industry is composed of marine production, in the manufacture of yachts, sailboats, and catamarans. The three main companies within this category are **Beneteau**, **Dufour**, and **Fountaine Pujot**.

#### 8) Aerospace:

Another 4% of French composites consumption comes from the Aerospace sector, where **EADS** and **Dassault** are the two corporate leaders in both civil and defense technology. In 2010, EADS—comprising Airbus, Astrium, Cassidian and Eurocopter—generated revenues of €45.8 billion and employed a workforce of nearly 122,000. Eco-efficiency is currently a major component of EADS developmental strategy for its products and industrial processes. Dassault, at its plant in Biarritz, France, manufactures and assembles various parts made from composite materials: wing panels, end plates, banners, hatches, etc.

Although, historically, the penetration rate of composites in civil aircrafts made by Boeing and Airbus was 2%, it has increased to 50% of the airframe for their most recent projects: A350 and B787. France in particular will be important to the growth in aerospace composites as the civil and defense aviation manufacturer Airbus (EADS) is headquartered in Toulouse. Other French defense end-users of advanced materials include DCNS (warships and submarines), Dassault (fighter jets), and the Safran group.

### **EXPECTED GROWTH**

The growth of the composites industry is mainly driven by expansion in underlying markets. Thus, as industries that are heavy users of composite materials grow, composite production will increase as well. Composites will continue to have a significant presence in the manufacture of automobiles, as well as civil and defense aircrafts, as industrial requirements in the area of weight reduction are a key consideration throughout the transport sector.

One industry that is expected to heavily grow over the next several years is wind energy. Globally, wind energy power installation could experience 25% to 30% growth per year, according to the Wind Energy Report. Composites have already reached their maximum penetration rate (65%) within wind energy structures, but due to the growth of the wind energy industry as a whole, composite consumption will continue to increase.

By 2015, the size of the composites industry in terms of volume will increase by 4% per year in Europe (compared to 2% per year in North America and 7% in Asia) and will represent 23% of the worldwide market in value to reach 20 billion Euros. Asia will experience the most significant growth as relocations of composite production plants from North America and Europe to Asia are expected by the year 2015.

### **COMPOSITES EQUIPMENT/MACHINERY**

Main categories of machinery related to the composites industry are:

- 1) Injection processes (SMC/Sheet Molding Compound, BMC/Bulk Molding Compound, Thermoplastic injection molding, RTM/Resin Transfer Molding, RIM/Reaction Injection Molding, GMT/glass mat thermoplastic)
- 2) Continuous processes (Pultrusion, Laminating and Filament winding).
- 3) Manual processes (manual molding & projection molding)
- 4) Compression processes (tape laying, autoclave process)

In Europe and France, injection processes represent 46% of industrial processes used for composite applications, followed by continuous processes with 23%, manual processes with 15% and compression processes 15%.

In volume, the weight of manufacturing processes in France and Germany reached 670 Ktons in 2010 (latest figures available), compared with 999 Ktons for the rest of Europe, 2,656 Ktons in North America and 3,026 Ktons in Asia.

## COMPETITION/MAIN ACTORS IN FRANCE

More than 10,000 companies and an estimated 150,000 employees are actively involved in composites production across Europe, with Germany and Italy as the main manufacturing competition. Below the list of main actors operating in France:

### Software:

- \*AFC-STAB COMPOSITES / <http://www.afcmecanum.com>
- \*ANSYS FRANCE SAS / [http://www.ansys.com/fr\\_fr](http://www.ansys.com/fr_fr)
- \*CREAFORM FRANCE SAS / <http://www.creaform3d.com/fr/default.aspx>
- \*DASSAULT SYSTEMES / <http://www.3ds.com/>
- \*ESI GROUP / <http://www.esi-group.com/>
- \*FORMES & OUTILLAGES / <http://www.formes-outillages.fr/>
- \*IMPETUS AFEA/ <http://www.impetus.no/>
- \*KEONYS / <http://www.keonys.com/>
- \*LECTRA/ <http://www.lectra.com/en/index.html>
- \*MF TECH / <http://www.mftech.fr/IDX.html>
- \*VETIGRAPH / <http://www.vetigraph.com/>
- \*VN COMPOSITES / [http://www.vn-composites.fr/html\\_en/accueil.php](http://www.vn-composites.fr/html_en/accueil.php)
- \*CORIOLIS COMPOSITES / <http://www.coriolis-composites.com>

### Raw Materials:

- \*ADDITEK SAS / <http://www.additek.net>
- \*ADERA (Canoe) / <http://www.plateforme-canoe.com>
- \*AFC-STAB COMPOSITES / <http://www.afcmecanum.com>
- \*ALCORE BRIGANTINE / <http://www.alcorebrigantine.fr>
- \*AXSON TECHNOLOGIES / <http://www.axson.com>
- \*BAMBOO FIBERS TECHNOLOGY / <http://www.bamboofiberstechnology.com>
- \*CRST SAS / <http://www.crst.fr>
- \*DALLET / <http://dallet.fr>
- \*DEDIENNE MULTIPLASTURGY GROUP/ <http://www.dedienne.com>
- \*DIATEX SAS TECHNICAL FABRICKS MANUFACTURER/ <http://www.diatex.com>
- \*DIL / <http://www.dilfrance.com>
- \*FORMES ET OUTILLAGES / <http://www.formes-outillages.fr/>
- \*FRP SERVICES EUROPE SARL / <http://www.frpservices.com>
- \*IMATTEC INTERNATIONAL / <http://www.immattec.com>
- \*KEYSER ET MACKAY (France) et CIE / <http://www.keysermackay.com/>
- \*LJF - LE JOINT FRANCAIS / [www.ljfm.com](http://www.ljfm.com)
- \*MULTIPLAST/ [www.multiplast.eu](http://www.multiplast.eu)
- \*NIDA MAINE/ MAINE PLASTIQUES / <http://www.nida-maine.com>
- \*NIDAPLAST CCOMPOSITES / <http://www.nidaplast.com>

- \*OLNICA / <http://www.olnica.com>
- \*PEINTURES DU MEDOC/ <http://www.peintures-du-medoc.com>
- \*PLASTICELL / <http://www.plasticell-honeycombs.com>
- \*POLYPROCESS SAS / <http://www.polyprocess.fr>
- \*PORCHER INDUSTRIES / <http://www.porcher-ind.com>
- \*PORTELLI PRODUCTIONS / <http://www.portelli-productions.com>
- \*PROTECHNIC / <http://www.protechnic.fr>
- \*PYROMERAL SYSTEMS / <http://www.high-temperature-composites.com>
- \*RESOLTECH SAS / <http://www.resoltech.com>
- \*ROCTOOL / <http://www.roctool.com>
- \*SAFRAN STRUCTIL / <http://www.structil.com>
- \*SCHAPPE TECHNIQUES / <http://www.schappe.com>
- \*SEALOCK / <http://www.sealock.fr>
- \*SICOMIN / <http://www.sicom.in.com>
- \*SNECMA PROPULSION SOLIDE / <http://www.snecma-propulsion-solide.com>
- \*SOLOPLAST VOSSCHEMIE / <http://soloplast.fr>
- \*SOLVAY SPECIALTY POLYMERS / <http://www.solvay.com>
- \*SORA COMPOSITES / <http://www.sora-composites.fr>
- \*STEVIK SAS / <http://www.stevik.fr>
- \*TELENE SAS / <http://www.telene.com>
- \*TIBTECH INNOVATIONS / <http://www.tibtech.com>
- \*TORAY CARBON FIBERS Europe / <http://www.toray-cfe.com>
- \*VITECH COMPOSITES / <http://www.vitechcomposites.com>

**Equipment:**

- \*AFC-STAB / <http://www.afcmecanum.com>
- \*01DB METRAVIB / <http://www.dma-instruments.com>
- \*ABRASIFS-SERVICES / <http://www.abrasifs-services.com>
- \*AEROFORM FRANCE / <http://www.aeroform-france.com>
- \*ANSYS FRANCE SAS / <http://www.ansys.com>
- \*ATOM BERAUD/ <http://www.atom-france.com>
- \*AUROCK / <http://www.aurock.fr>
- \*AVIACOMP SAS / <http://www.aviacomp.fr>
- \*AZIOME / <http://www.axiome.com>
- \*BESNE MECANIQUE DE PRECISION/ <http://www.elyps.fr>
- \*BIHARTEAN CCI / <http://www.bihartean.com>
- \*CANNON FRANCE / <http://www.cannon.fr>
- \*CGTECH / <http://www.cgtech.com>
- \*CMG / <http://www.cmq-france.com>
- \*COMPOSE / <http://www.compose-tools.com>
- \*COMPOSITES MACHINES SYSTEMES / <http://www.cms-france.fr>
- \*CORIMA TECHNOLOGIES / <http://www.corima-technologies.com>
- \*CORIOLIS COMPOSITES / <http://www.coriolis-composites.com>
- \*CREAFORM FRANCE SAS / <http://www.creaform3d.com>
- \*CRST SAS / <http://www.cfst.fr>
- \*DASSAULT SYSTEMES / <http://www.3ds.com/composites>
- \*DAXEN / <http://www.daxen.fr>
- \*DEDIENNE MULTIPLASTURGY GROUP / <http://www.dedienne.com>
- \*DIATEX SAS TECHNICAL FABRICS MANUFACTURER / <http://www.diatex.com>
- \*DUTHEL MAINTENANCE MOULES / <http://www.dmm.fr>
- \*ESI Group / <http://www.esi-group.com>

\*FOREST LINE / <http://www.forest-line.com>  
\*FORMES ET OUTILLAGES / <http://www.formes-outillages.fr>  
\*GEBE2 PRODUCTIQUE / <http://www.gebe2productique.com>  
\*HEXAGON METOLOGY / <http://www.hexagonmetrology.com>  
\*HUGUET INGENIERIE / <http://www.groupe-huguet.fr>  
\*IMPETUS AFEA / <http://www.impetus-afea.com>  
\*INSTRON / <http://www.instron.com>  
\*IREMO PROJECT / <http://www.iremo.eu>  
\*ISOJET EQUIPMENTS / <http://www.isojet.com>  
\*JALLAIS INDUSTRIE / <http://www.jallais.com>  
\*JEDO TECHNOLOGIES / <http://www.jedotechnologies.fr>  
\*KEONYS / <http://www.keonys.com>  
\*KISTLER FRANCE / <http://www.kistler.com>  
\*KOLLER SAS / <http://www.koller.fr>  
\*KUKA / <http://www.kuka.fr>  
\*LE CRENEAU INDUSTRIEL / <http://www.creneau.fr>  
\*MAPAL / <http://www.mapal.com>  
\*MATRASUR COMPOSITES / <http://www.matrasurcomposites.com>  
\*MESCAN / <http://www.mescan.com>  
\*MF TECH / <http://www.mftech.fr>  
\*MIB HYDRO GROUPE DIMECO / <http://www.mibhydro.fr>  
\*MIL'S SAS / <http://www.mils.fr>  
\*MULTISTATION SAS / <http://www.multistation.com>  
\*OLYMPUS FRANCE / <http://www.olympus.fr>  
\*PINETTE EMIDCAU INDUSTRIES/ PEI / <http://www.pinetteemidecau.eu/>  
\*PLASTICON COMPOSITES / <http://www.plasticoncomposites.com>  
\*PLASTINOV SNE / <http://www.plastinov-composite.fr>  
\*POLYECIM/ PLASTIMA/ YFFIPLAST COMPOSITES / <http://www.polycim.fr>  
\*PORTELLI PRODUCTIONS / <http://www.portelli-productions.com>  
\*PRECEND – SYNERVIA / <http://www.precend.fr>  
\*PRECORP / <http://www.sandvik.coromant.com>  
\*PROFILE CONTROLES INDUSTRIELS / <http://www.profile-ci.fr>  
\*PYROMERAL SYSTEMS/ <http://www.high-temperature-composites.com>  
\*ROCTOOL / <http://www.roctool.com>  
\*SANDVIK COROMANT / <http://www.sandvik.coromant.com>  
\*SAS MPRD (JV Group) / <http://www.mprd.fr>  
\*SAT / <http://www.sat-thermique.com>  
\*SECO AOB / <http://www.secotools.com/fr>  
\*SIEMENS / <http://www.siemens.fr/automation>  
\*SNECMA Propulsion Solide, Groupe Safran / <http://www.snecma-propulsion-solide.com>  
\*SORA COMPOSITES / <http://www.sora-composites.fr>  
\*STAUBLI / <http://www.staubli.com>  
\*STEVIK SAS / <http://www.stevik.fr>  
\*STOPP- BETTCHER / <http://stopp-grp.oxatis.com>  
\*STRATIME COMPOSITES SYSTEMES / <http://www.stratime.com>  
\*SWISSTEX FRANCE SAS / <http://www.swisstec.fr>  
\*TECHNI-MODUL ENGINEERING / <http://www.techni-modul-engineering.eu>  
\*TIBTECH INNOVATIONS / <http://www.tibtech.com>  
\*VETIGRAPH / <http://www.vetigraph.com>  
\*VN COMPOSITES / <http://www.vn-composites.fr>

## DISTRIBUTION

There are different levels of distribution in the composites industry. In general, sales of resins (thermoset, thermoplastic), fibers (glass fibers, Carbon, Aramid, Natural), prepregs, pellets and fabrics, are done by direct sales between the supplier and the end-user.

Intermediaries such as distributors or agents are required for sales of additives and machinery/equipment (molds, machinery and software).

### Main composites raw material distributors in France:

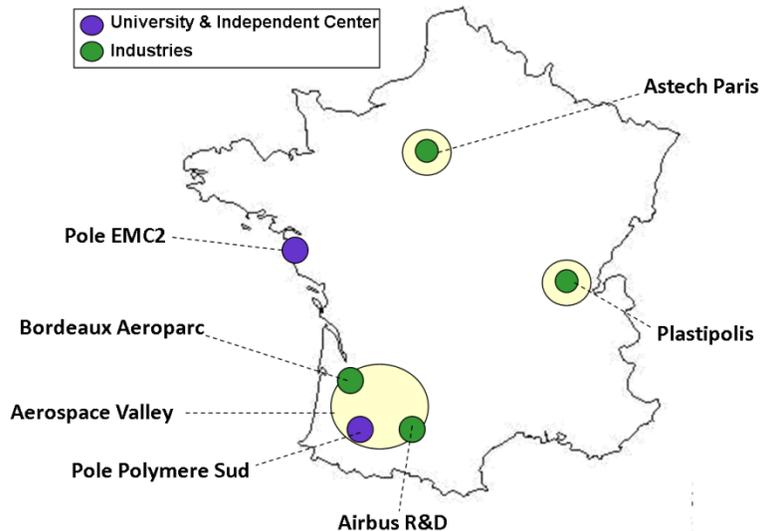
- \*AZELIS FRANCE/ <http://www.azelis.com/en/>
- \*ECD / <http://ecd-france.com/>
- \*EURORESINS FRANCE SAS / <http://www.euroresins.com>
- \*FOURNIER GROUPE / <http://www.fournier-thermoplastiques.com/>
- \*GACHES CHIMIE SPECIALITES / <http://www.gaches.com>
- \*GAZECHIM COMPOSITES / <http://www.gazechim.com>
- \*NORD COMPOSITES/ <http://www.nord-composites.com/>
- \*POLYPROCESS SAS / <http://www.polyprocess.fr>
- \*SCOTT BADER/ <http://www.scottbader.fr>
- \*SF COMPOSITES/ <http://www.sf-composites.com>
- \*SOLOPLAST VOSSCHEMIE SAS/ <http://www.soloplast.fr>
- \*UMECO DISTRIBUTION SAS/ <http://www.grpms.fr>

### Equipment distributors:

- \*MF TECH / <http://www.mftech.fr>
- \*MATRASUR COMPOSITES / <http://www.matrasurcomposites.com>
- \*MULTISTATION SAS / <http://www.multistation.com>
- \*COMPOSITES MACHINES SYSTEMES / <http://www.cms-france.fr>
- \*ISOJET EQUIPMENTS / <http://www.isojet.com>
- \*LE CRENEAU INDUSTRIEL / <http://www.creneau.fr>
- \*DIL / <http://www.dilfrance.com>
- \*STOPP- BETTCHER / <http://stopp-grp.oxatis.com>
- \*COMPOSITES DISTRIBUTION / <http://www.composites-distribution.com/>

## COMPOSITES CLUSTERS IN FRANCE

The French government began the national program of competitive clusters in 2004 in order to develop the comparative advantage of French industries. These competitive clusters bring together companies, research and development centers, institutions, and public establishments in order to foster synergy and cooperation to promote innovative projects. The purpose is to allow companies to assume a position at the forefront of their field, not only in France but in the world. Six competitive clusters devote their resources and research to the composites industry. These clusters seek to promote a dynamic image of the French composites industry, find new applications for composites, support the entry of companies into new markets, and ensure that the cluster is well positioned in the global composites industry.



### Airbus R&D

Airbus R&D is the research and development branch of Airbus. A great deal of their work is dedicated to the advancement of composites in aeronautical structures. In 2011, the R&D teams of Airbus, Technocampus (Pays de la Loir region, France), EADS Innovation Works (IW) and Ecole des Mines, took delivery of LUCIE, a noncontact, non-destructive, laser-ultrasound machine that will be used to detect sub-surface flaws in composite aerostructures.

### Astech Paris

Committed to the advancement of innovation in the Aeronautical, Space, and on-board systems industry, Astech Paris has recently set several projects in motion to increase the penetration of composite materials in structures in the fields of aeronautics, land transport, energy, and wind. As such, Astech Paris wishes to eventually reduce the mass of structural parts by 20 to 70 percent.

### Bordeaux Aeroparc

An important resource center in Aerospace valley, *Bordeaux Aeroparc* has launched projects to find new applications for composite materials to reduce costs in the manufacturing process. One of their most recent projects develops a new measurement device for temperature follow-up during the fabrication of tools in severe conditions as well as new solutions to minimize thermo-mechanical constraints by removing materials – thus preserving the consistency of fabricated materials.

### Plastipolis

Recently, *Plastipolis* has added two new departments to their research and development centers: a “Technological Innovation” department and a “Performance, Proficiency, and Network Development” department. Both departments collectively develop projects and expand the network of the French composites industry. In addition to the expansion of their R&D field, Plastipolis has initiated several projects aimed at finding innovative ways to recycle composite materials as well as projects designed to develop new powder formulation for prepregs.

### Pole EMC2

*Pole EMC2* aims to strengthen and develop a world-class network of research and industrial applications in key-technologies tied to the manufacturing of metal materials and composites. Currently, Pole EMC2 is finishing its Eurecomp project. This project addresses the absence of

recycling centers and methods adapted to composites. With the use of depolymerization, Pole EMC2 is looking for new ways to employ used composite materials.

### **Pole Polymere Sud**

*Pole Polymere Sud* serves as a R&D center for SME's in the composites industry. It offers companies technical training programs in the newest conception and manufacturing techniques in the field and it additionally aids in the execution of projects.

## **RESOURCES**

- Overview of the Worldwide Composites Industry: 2010-1015 - JEC Composites Group. <http://www.ieccomposites.com>
- JEC COMPOSITES SHOW EUROPE, March 12-14, 2013
- Groupement de la Plasturgie Industrielle et des Composites. [www.gpic.fr](http://www.gpic.fr).
- Composite Market Report. AVK Federation of Reinforced Plastics. <http://www.avk-tv.de/files/20110929 Marktbericht 2011 englisch.pdf>

### **U.S. Commercial Service Contact**

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