CASTRO COMPOSITES

GENERAL COMPOSITE MATERIALS

Index

1 What is a composite?

A composite is a material composed of a matrix (resin) and a reinforcement fibre (glass, carbon, aramid, etc.), which combined acquire high mechanical, chemical and aesthetic properties.

These are very strong and lightweight materials that are extremely useful for manufacturing a multitude of parts in many industrial sectors.

2 In which sectors are carbon composites present?

Composites are present in many of the objects that surround us and very significantly in the industry at almost all levels. It is ifficult to find any sector in which composites are not involved in some way or another.

Below are the main sectors where we find the Composites:

- **Marine**: manufacturing of all kinds of high-end recreational boats, competition and military.
- **Renewable energies**: manufacturing of blades, spars, etc. for wind or underwater turbines.
- **Automotive:** manufacturing of bodies and chassis, interiors, roofs, doors, etc. in competition and military vehicles (cars, off-road vehicles, motorcycles, etc.
- **Aeronautics/Aerospace:** manufacturing of numerous parts for commercial and military aircraft, UAVs, and USVs (wings, flaps, fuselages, cabins, interiors, etc.).
- **Construction:** manufacturing of pipes, beams, roofing elements, bridges, etc.
- **Sports**: manufacturing of canoes or kayaks, skateboards and skis, etc.
- **Art and decoration:** furniture (tables, chairs, lamps, etc.)
- **Scenography and Model Making**
- **Architecture & Others**

3 Who is our course aimed at?

- **Employees of any company related to Composites.** The courses are designed to be taken by personnel with low technical qualifications up to even production or technical area managers who want to reinforce or expand their theoretical and practical knowledge.

- **Individuals or independent professionals** with a desire to start a new business or career who want to access this sector with an in-depth knowledge of the materials and the processes related to Composites.

- **Technicians from research and R&D centres**, who wish to train in the production techniques used in Composites, as well as study the properties of new materials and manufacturing processes.

- **University and vocational training students** to whom a future-oriented education is to be provided.

- **Postgraduate students**: architects, technical architects, industrial engineers, aeronautical engineers, naval engineers, chemists, etc.

- **Unemployed individuals** from sectors involved in Composites,- or from other sectors—who wish to gain a professional qualification oriented towards new technologies.

More than 1200 trained students endorse us!

4 What is the course syllabus?

Theoretical content

The main mechanical, physical and chemical properties of the most important thermosetting resins on the market are studied, focusing primarily on **POLYESTER**, **VINYL ESTER** and **EPOXY resins**. New generation resins such as those derived from **URETHANE-ACRYLATE** chemistry are also mentioned. The variants of these resins are studied – low styrene emission resins (DCPD), vinyl ester-DCPD resins, and so forth.

Special attention is paid to gelcoat applications and the different types and their application methods are studied, emphasising possible failures and how to avoid them. We study gelcoats for parts and moulds, differentiating between polyester, vinyl ester and epoxy gelcoats. The new **GelTint polyester gelcoats from Scott Bader** will be presented.

The main applications of thermosetting resins are analysed: cross-linking monomers, catalysts, accelerators, hardeners and inhibitors.
The importance of the resin polymerisation cycle is analysed in detail: gel time, exothermic peak, hardening and curing.
The importance of the mechanical properties of these materials is highlighted, specifically the relevance of Hooke's Law and Young's modulus.
We focus on the importance of the glass transition temperature (Tg) or heat distortion temperature (HDT) of resins.
Additives for thermosetting resins: thixotropy, pigmentation, fillers, diluents and flexibilisers.
Reinforcing fibres: glass, carbon, aramid (better known by one of its trade names, Kevlar® or Twaron®), as well as combinations thereof. We will learn about spread tow carbon fibres. The mechanical, physical and chemical properties and their associated composites are studied.

Materials for manufacturing sandwich structures **(PVC cores, balsa wood, Sphere.tex and Sphere.cores, SAN, PMI, PET, Core Cork®, Millifoam®, honeycomb, and so forth)**. Compression and shear resistance of this type of sandwich laminate, which is characterised by its lightness and rigidity. These are the most commonly used structures in the construction of boats, aeroplanes, wind turbine blades, etc.

Mould release agents. We study the latest / cutting edge / high tech semi-permanent mould release agents, which we will use during the practical sessions, and we will indicate their advantages over older mould release agents, such as waxes or polyvinyl alcohols.

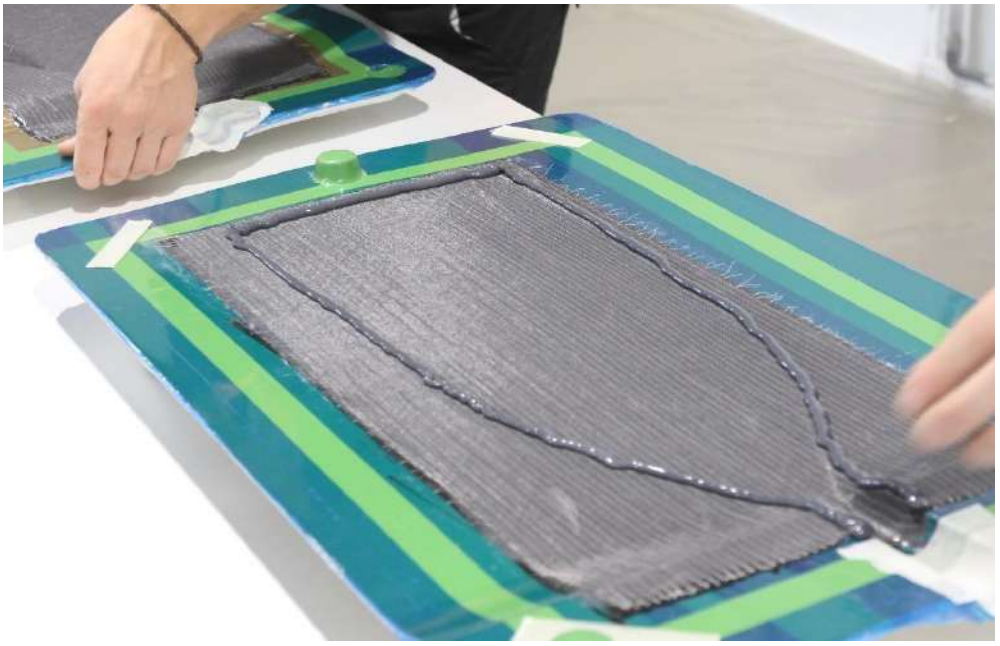
Manufacture of composite moulds with low-shrinkage polyester and vinyl ester resins. Construction materials and processes (low-profile or very low-shrinkage resins and exothermic peak).

Manufacture of moulds with epoxy resins. High Tg epoxy resins. Virtually zero-shrinkage resins. Vinyl ester gelcoats compatible with epoxy laminates.

Structural adhesives. Properties and uses. Epoxy, urethane acrylate and methacrylate adhesives for structural bonding of composite-composite, metal-composite, metal-metal, wood-composite, etc.

We will pay special attention to adhesives from the **Crestabond®** range, manufactured by Scott Bader, which can even be used to bond galvanised and zinc-coated metals, as well as a wide range of plastics.

Manufacturing processes: summary of all composite manufacturing processes (hand lay-up, spray-up lamination, centrifugation, filament winding, RTM, VARTM, SCRIMP, pultrusion, vacuum infusion, SMC, BMC, GMT, etc.).



Crestabond M1-20 (methyl methacrylate adhesive) application on carbon-epoxy laminate.

Special emphasis will be placed on composite manufacturing processes using the **RTM** technique (lightweight and classic) and the **vacuum infusion** process. We will devote one day of the five-day course to these processes. Description of the processes. Moulds and components used, machinery, resins, fabrics, consumables, type of resin flow, injection and vacuum pressures, etc.

We will be visited by staff from **Magnum Venus Products (MVP)**, a world leader in injection equipment (RTM).

Typical Manufacturing process and Production costs.

Practical content

1. Introduction to Chemtrend® semipermanent release agents: water-based and polymeric sealers and release agents (Chemlease Flex Z® and PMR®) as weel as the Mikon® range. Comparison with waxes and polyvinyl alcohol. Advantages and disadvantages.

2. Manufacturing composite parts by hand lay-up using ortho and isophthalic polyester resins, as well as fire-resistant (Crestafire®) resins, reinforced with glass fibers.

Practical content

1 Manufacture of an aesthetic carbon part using transparent epoxy resin and carbon fabrics. These resins are widely used in decorative applications

in sectors such as tuning, motorcycles, furniture, instrument enclosures, etc. We use the vacuum bagging technique.

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2 Mould production using chopped-strand glass mat and low-profile or near-zero shrinkage polyester resins. We will use a urethane-vinylester gelcoat and a vinylester-DCPD resin for the first reinforcing layer (**Scott Bader Rapid Tooling system**).

3 Construction of a small epoxy mold. We will use epoxy resin and the epoxy-compatible vinylester gelcoat **Resoltech VI5090** with high Tg, and a high-thermal-resistance epoxy resin.

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4. Vacuum infusion Manufacturing of a 4 m long wind turbine blade in a sandwich structure using glass fabrics, PVC foam (Millifoam DIVH80) and core materials such as Sphere.tex and Soric. The high-toughness urethane-acrylic resin **Crestapol 1260** will be the matrix. We will use a fiberglass mould made with epoxy resin.

5. Adhesives practice: composite-to-composite, composite-to-metal, metal-to-metal, and wood-to-composite joints (test specimens) made with epoxy adhesives **Resoltech® 3350ECO/3358T** , methacrylate (**Crestabond®**), and urethane-acrylate (**Crestomer 1152 PA®**).

6. Manufacture of the deck of a 3-meter recreational boat using the vacuum infusion technique. We will use polyester resin, **Metycore** fiberglass, **multi-axial glass fabrics** , and cores of **PVC**, **balsa wood**, and **Sphere.core**.

7.

8 Manufacture of a composite sled injected by Light RTM (Resin Transfer Moulding), using the high-fire-resistance **Crestapol 1211A** resin.

5 Where are our training courses held?

Castro Composites has excellent facilities, covering more than 1200 m^2, in the Industrial Estate of Areas, located in Tui (Pontevedra, Spain), where we have suitable facilities, with fully equipped classrooms and worshops for theoretical and practical presentations. We also offer our training courses at our clients' facilities, but in this case, special and tailored offers are made to meet their needs.

6 Who have benefited from our training courses in recent years?

1. **Client companies of Castro Composites** involved in any of the sectors described above, such as:: Sociedad Andaluza de Componentes Especiales (S. A. C. E. S. A.), EUROCOPTER ESPAÑA (Rota, Cádiz), GURIT (One of the world leaders in the manufacturing of epoxy resins, pre-impregnated materials, etc), Nordex Blades S. A. U (a world leader in the production of wind turbine blades), HG Windtec Costa Rica and Coverwind (Wind turbine blade repair companies), TPI Composites (Wind turbine blade repair and producer), BTREN Bombardier, Stadler Rail Valencia S.A.U. and Talgo (Train Manufactures), TRETY (Automotive); RODMAN POLYSHIPS, Prosailing and Astilleros Cata (marine), Dronetools (UAVs and helycopters), ELA Aviación (autogyros), FIBERGLAS (Tank and depot manufacturer), AMORIM (Core Cork manufacturer), INGEMAT and TALIO Ingeniería (Composite Materials Engineering), Zyvax (Release Agents manufacturer), Grupo Navec (Refineries and facilities at nuclear power plants), Constructora Eshor (Building & Construction), ALSA AUTOBUSES and Modasa Perú (Bus manufacturers), Mascyf (Fire protection equipment), Aseguradora Mapfre (insurance company), Palfinger Marine, Intermas Nets (vacuum materials manufacturer), Stahl S.A.C. Peru (Manufacturing of boilers, storage tanks, and containers) , Transportes Navarro Puente, S. A Perú (Transportation of hazardous waste), MOLDEAR PILETAS Y PREMOLDEADOS, S.A. Argentina (Manufacturer of swimming pools), Marinas dedicated to the repair of fiberglass reinforced plastic (FRP) boats, and many more ...

2. **Public organisations** such as the University of Vigo (School of Industrial Engineering and the School of Technical Engineering), University of Navarra, the Polytechnic University of Madrid, Polytechnic University of Catalonia, University Rey Juan Carlos (Madrid), University Jaime I (Castellón), University of la Frontera (Chile), National Center for Development in Telecommunications Research (CENDIT) (Caracas, Venezuela), University of Puerto Rico, Vocational Training Xunta de Galicia, etc.

3. **Technological centres** : Automotive Technology Center of Galicia (CTAG), AIMEN Technology Center, AITEX, CTM Technology Center Foundation (Manresa), Gaiker Foundation (Vizcaya), Galician University Business Foundation, Cidaut Foundation (Valladolid), Ascamm Foundation (Barcelona), CEDER-CIEMAT (Center for Energy, Environmental and Technological Research) of the Ministry of Economy of Spain, Prodintec Foundation (Asturias), Technological Center CETIM (Barcelona), etc.

4. **Individuals or self-employed persons** who wanted to start a business project and were unaware of these applications, or simply aimed to improve their skills and discover new materials and processes related to composites.

5. **Unemployed individuals or those seeking their first job**: We have trained dozens of people and helped them secure employment in the composite materials sector or develop their own business projects.

6. We have trained students from all over Spain and abroad, including Portugal, Italy, Germany, the USA, Australia, Mexico, Costa Rica, Panama, Venezuela, Colombia, Ecuador, Peru, the Netherlands, Paraguay, Puerto Rico, Argentina, Chile, Uruguay, Brazil, Lithuania, England, Western Sahara, and Angola, among others..

7.


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7 What is the duration and schedule of the course?

5 intensive days, from Monday to Friday.

Schedule:

- Morning: from 9:00 to 14:00
- Afternoon: from 15:30 to 18:30

8 What is the price of the course?

1595 €/trainee (+ 21% de IVA).

The price includes coffee/ mid-morning snack, as well as lunch during the 5 days.

Special discount for groups! Check our offers.

9 When is this course held?

From September 28 to October 2, 2026

From 9:00 to 14:00 and from 15:30 to 18:30

1595 €/trainee + VAT

Reservation of a place is only guaranteed upon payment of 1595 € + VAT into the Caixabank S.A. IBAN account number: ES02 2100 5911 1302 0000 0430, SWIFT / BIC: CAIXESBBXXX and the submission of this form with your personal or company data by email to the address listed at the bottom.

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First Name and Last Name: _____

Address: _____

_____

VAT Number (companies) or TIN (Tax Identification Number, individuals): _____

Phone: _____

Email: _____

Signature: _____

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10 Recent courses


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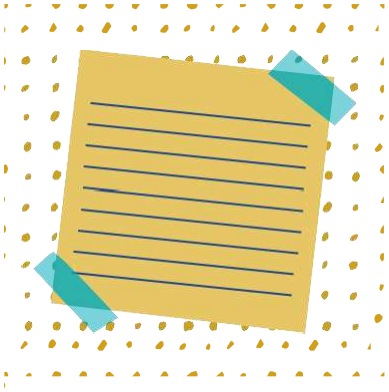
11 What do they think of our training courses?



A few years ago, I undertook a project to develop a sailboat that was innovative in terms of accessibility for people with special needs. At that time, I took a hands-on composite materials training course at Castro Composites. After the course, I began making my first parts and, over the following months, I regularly consulted Castro Composites. Eventually, we built together at Skillful3D's facilities the plug, molds, and hulls for the first Inclusion Catamaran. This work also enabled me to create my own company, which remains closely linked to Castro Composites for materials procurement and technical support.

FREDERICO CERVEIRA

Inclusive Sailing

Castro Composites' training courses are an investment in the future. They have given me a more comprehensive view of the composites world, as well as the right tools and knowledge for my professional development. Specialized training is key and necessary to stand out in the job market. Their ongoing advice and support motivated me to become an entrepreneur in this sector, leading to the creation of Volcan Boats, a company primarily dedicated to manufacturing high-performance dinghies for top-level competition.

FERNANDO MESA GARCÍA

Volcan Boats S.L.

Since I was very young, I've practiced rowing and always had a dream: to have my own company making rowing boats. From the moment I contacted the Castro Composites team to take this course and later, once I started my business, I received great technical support that allowed me to found my own company building both sliding-seat and fixed-seat rowing boats. With Castro Composites I gained knowledge about resins, reinforcement fibers, cores, and above all the techniques to manufacture high-quality composites. Today I've mastered infusion processes thanks to their constant support in resolving any questions. I'm deeply grateful to the Castro Composites team for all their support and patience over these years.

ANTONIO ABEL SALAS MÉNDEZ

La Línea de la Concepción, Cádiz (España)

Excellent course. The theoretical and practical content were well structured, and whether you're a beginner looking to take a more serious step into the field of composite materials or you already have experience but want to improve, the instructors put you in real situations and teach technical best practices to get the most out of your work. Attention to detail and the close, friendly approach of management and technical staff create a very pleasant learning environment. They are professionals who inspire confidence, and their extensive experience shows in everything they do. Committed to clearing up doubts and dedicated to their students, they build lasting ties to stay in touch after the course and put everything learned into practice. A highly recommended course for getting started in the complex world of composite materials.

OTTO RAFAEL OLIVARES SIERRA
Barcelona (España)

A well-known slogan says: "Power without control is useless." Likewise, no matter how much enthusiasm and effort you have, without proper learning, your project will hardly succeed! In this regard, Castro Composites' Composite Materials Courses laid the foundation to channel all that energy in the right direction. With solid, high-quality training, the path has been much easier. After many months of self-taught work, I decided to take their Composite Materials course. After just one day, I realized all the time, effort, and money I would have saved if I had done it earlier. If, like me, you want to make a living from composites, training isn't just recommended—it's essential. I will be eternally grateful to the Castro Composites team.

DAVID SEGADE FREIRE
Karbonius Composites

I currently work at the AD Parts Group training center. My job requires me to be constantly learning. My experience in the two courses, each over 50 hours, was very positive—learning new things is always constructive, but when you do it with people who are professional, intelligent, have a good sense of humor, and above all are good people, the course week flies by. I truly believe the world of composite materials has great career prospects. Another thing I greatly appreciated is the attention I received whenever I needed to ask a question; they have no obligation to provide guidance after the course, yet they do so with professionalism and kindness.
Would I recommend Resinas Castro's courses? Without a doubt!

CARLOS FERNÁNDEZ PIÑEIRO
AD Parts

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Valoración media de nuestros estudiantes

CASTRO
COMPOSITES

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