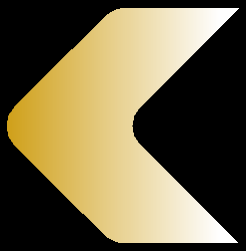
CASTRO COMPOSITES

CARBON FIBRE COMPOSITE MATERIALS



TRAINING COURSE

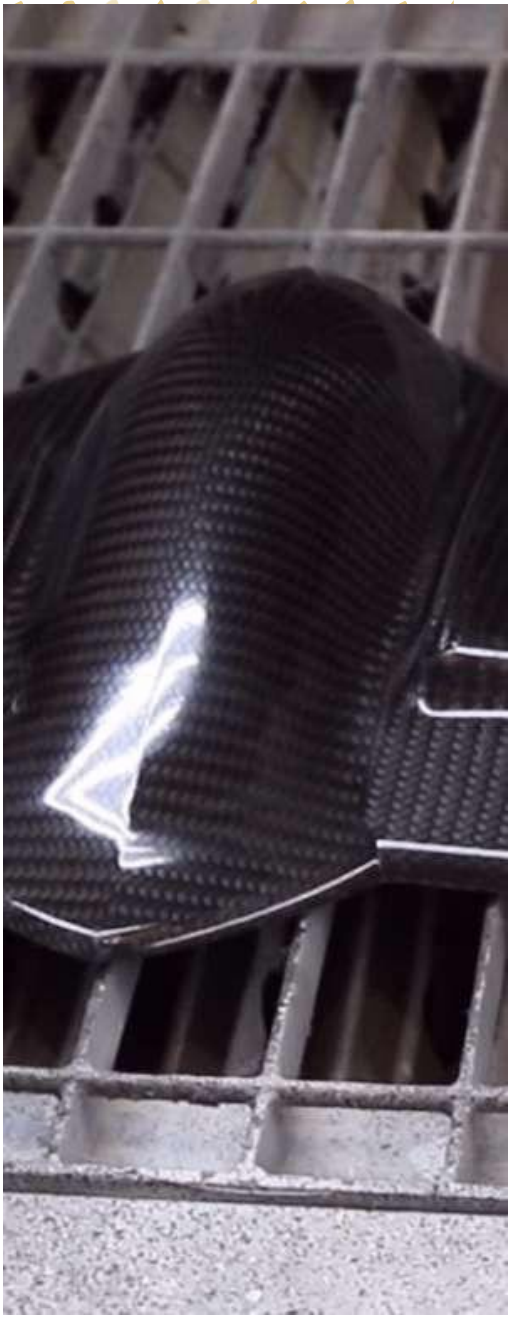
Index

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 difficult 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.
- **Aeronautics/Aerospace:** manufacturing of numerous parts for commercial and military aircraft, UAVs, and USVs (wings, flaps, fuselages, cabins, interiors, etc.).
- **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.).
- **Construction**: manufacturing of pipes, beams, roofing elements, bridges, etc.
- **Sports**: manufacturing of canoes or kayaks, skateboards and skis, etc.
- **Urban and domestic furniture.**
- **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

Training course for the introduction to the applications of composite materials that use carbon fibres as a reinforcing element. The course focuses on applications with carbon pre-impregnated (prepregs) made with high-performance epoxy resins; however, other manufacturing processes in a vacuum environment, such as infusion and manual wet lay-up, will also be analysed.

This training course introduces participants to the world of CFRP (Carbon Fibre Reinforced Plastics) and their application/manufacturing techniques.

We will study the main properties of carbon fibres, the different types of fibres, the types of fabrics available y how y when to use them.

The most important types of thermosetting resins used to produce carbon fibre parts y moulds are analysed. We will study their mechanical, physical y chemical properties, as well as compatibility among themselves, etc. We will focus on urethane- acrylate, vinyl ester y epoxy type resins.

We will analyse the most common core materials for the manufacturing of lightweight light y rigid sandwich structures: balsa, PVC, PET, SAN, non-woven cores y honeycombs.

Adhesives will be another essential topic during this training course, analysing types, properties, compatibility, heat resistance...

Practical content

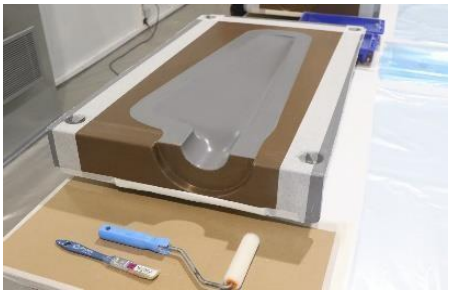
In this course, which is predominantly practical, the student will learn about the manufacturing processes used to produce parts and moulds from carbon/epoxy prepreg, used in high-performance applications (aeronautics, automotive, nautical, wind energy, etc.). The characteristics and main properties of these materials and their manufacturing processes are studied.

Furthermore, in order to provide a general overview of these applications, we will also make a small part (blade of an underwater generator), manufactured by hand lay-up (manual lamination), as well as the hull of a 5.5 m kayak, manufactured by the vacuum infusion method with carbon fibres and using PVC foam with a density of 80 kg/m^3 as a sandwich core, in addition to other non-woven fabric cores (Sphere.core and Sphere.Cel HX).

The student will learn to fabricate carbon parts with a visible finish (cosmetic), a carbon composite mould using prepregs and another by manual lamination, as well as a hollowed rear trunk spoiler using carbon structural prepregs from SHD Composites.

Additionally, different monolithic and sandwich specimen-type laminates are manufactured, with the purpose of analysing the importance of reinforcement orientations and the choice of core type to improve resistance to bending, torsion and shear.

We will study structural methacrylate adhesives for carbon-carbon, carbon-metal, carbon-plastics and carbon-other composites joints.



Monday

THEORY

General introduction to composites: with special emphasis on carbon/epoxy prepreg composites for oven curing and out of autoclave. Basic lamination for parts and moulds.

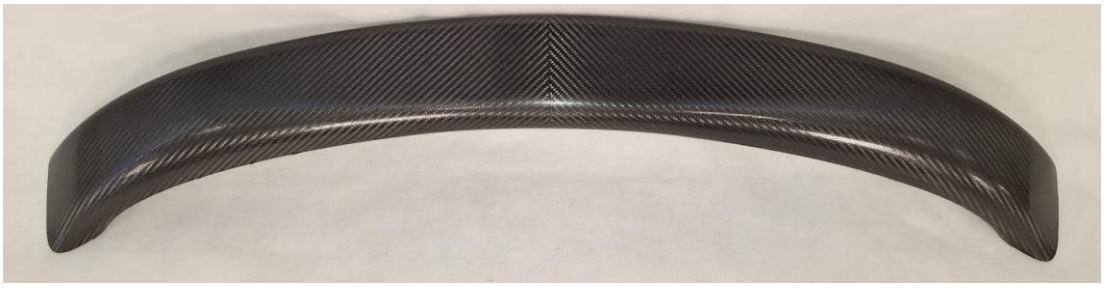
- What is a Composite?
  - Advantages of Composite
  - Types of Matrices (resins)
  - Type of Reinforcements: carbon fibre, aramid and glass properties

PRACTICAL APPLICATION

- Chemtrend semi-permanent release agents.

- Manufacturing of the two shells of a small blade of an underwater generator using transparent epoxy resin with UV filter Resoltech 1070/1077. Twill and biaxial carbon fabrics are used.

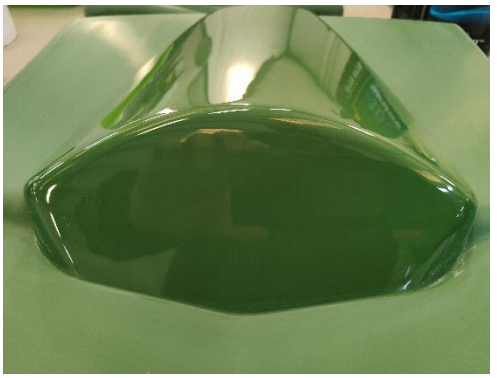
- Manufacturing of a rear trunk spoiler in sandwich structure with Millifoam foam of thickness 2 mm using structural prepregs



Tuesday

THEORY

- Prepregs
- Definition
  - Nomenclature associated with prepreg Storage
  - Safety and Health
  - Types of processing Repairs
  -
- Vacuum bagging technique (Vacuum Bagging)
  - Processing parameter
  - Auxiliary materials Curing
  - oven
  - Autoclave
- Defects and failures in the processing of prepregs
  - Debulking: Vacuum compactions Bridging:
  - Bridging
  - Porosity
  - Vacuum integrity
  - Consistency and vacuum level
  - Heating ramps
  - Failures in core structures
  - Problems in transportation and storage of the prepreg
- Surface quality e interlaminar.
- Introduction of carbon/epoxy prepreg moulds manufacturing.



PRACTICAL APPLICATION

- Construction of a carbon mould using low-temperature curing surface and syntactic carbon/epoxy prepregs. We will emphasise the placement and orientation of carbon fabrics: butt joints, sharp angles, debulks, etc.

Wednesday

THEORY

- Infusion/vacuum process: process description, materials and types of moulds
- Sandwich structures: Types of cores (honeycombs, PVC, PET, CORE CORK, SAN, PMI, polyurethane, etc.). Methods of constructing sandwich Composites.

PRACTICAL APPLICATION

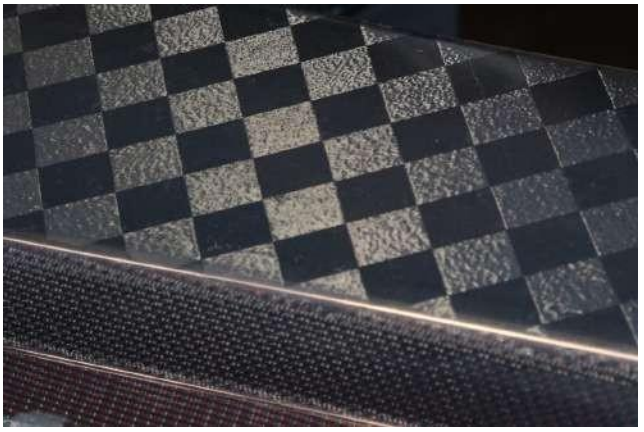
- Manufacturing of a sea kayak hull, 5.5 m in length, with carbon fibre and various cores (5 mm PVC foam, Soric, Sphere.core PSI…), for the construction of a sandwich with Crestapol® 1261 resin of urethane-acrylate type. The infusion/vacuum technique will be used.

  Manufacturing of a cosmetic carbon part using prepregs. We will make small airplanes and car bodies.

- Bonding of the two shells of the carbon underwater generator blade using Crestabond® M1-20 methacrylate adhesive.
- Manufacturing of an aesthetic guitar case carbon cover using Resoltech 1050 epoxy resin by vacuum infusion.

Thursday

THEORY



- Structural applications
  - Criteria for material selection Matrices
  - Adhesive
  - Reinforcements
- Cosmetic applications
  - Criteria for the selection of material Matrices
  - BPS (Body panel system). Carbon pre-impregnated for vehicle bodies, sports and competition.
  - Materials
  - Costs
  - Properties
  - Examples
- Structural adhesives. Properties and uses. Epoxy adhesives, urethane-acrylate and methacrylate for structural bonding composite-composite, metal-composite, metal-metal, wood-composite, etc. We will pay special attention to the adhesives of the Crestabond® range, from the firm Scott Bader, with which even galvanised, and zinc-coated metals can be bonded.

PRACTICAL APPLICATION

- Production of a cosmetic guitar case by infusion.
- Injection moulding of high compression strength and low-density Resoltech 2080M25 foam into the underwater generator blade mould.
- Structural adhesives: epoxies and MMA

Friday

PRACTICAL APPLICATION

- Preparation of different monolithic laminate and sandwich specimens to study the strength of the laminates based on the orientation of the carbon fibres. Analysis of the manufactured specimens: importance of the orientation of the fibres and sandwich structures.
- Manufacturing of a small Master Model made of carbon fibre using a high TG polyester gelcoat (UP571) and high Tg tooling epoxy resin (Resoltech 1040/1041HT)
- Demoulding and study of the parts made during the course.

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 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 has benefited from our training courses in recent years?

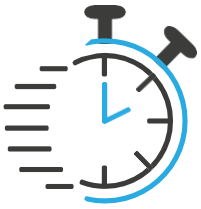
1. **Client companies of Castro Composites** involved in any of the sectors described above, such as: Skydweller (Aeronautics), RFA (Rocket Factory), Iceye Spain (Aerospace), Asea Brown Boveri (ABB), King Agro (agriculture), Ubitech, Sociedad Andaluza de Componentes Especiales (S.A.C.E.S.A.), EUROCOPTER SPAIN (Rota base, Cádiz), BTREN Bombardier (trains), PATENTES TALGO (trains), TRETY (Automotive), TEKPLUS (UAVs), AMORIM (Core Cork Manufacturer), INGEMAT (Engineering in Composites), TALIO Engineering, Astilleros Cata, Zyvax (Release Agent Manufacturer), Constructora Eshor, Transformados Ocaña (wind, construction, automotive, etc.), ACCIONA BLADES (wind), Grupo PSA Peugeot-Citroën (automotive), COMINDEX, GURIT SPAIN (pre-impregnated manufacturer), Grupo Navec (chemical sector), Viesgo Energía, Marine Instruments, Mondraker (carbon bicycle manufacturer), ENAER (National Aeronautics Company of Chile), National Aeronaval Service of Panama, Edge Autonomy Letonia (drones), etc.

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 of Temuco (Chile), 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), etc.

4. **Individuals or freelancers:** starting a business project or seeking professional development.

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 15:00 to 18:00

8 What is the price of the course?

1595 €/ trainee (plus VAT taxes)

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

Special discount for groups! Check our offers.

When is this course held?

From July 20 to 24, 2026

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

1595 €/trainee + VAT taxes

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.

First Name and Last Name: _____

Address: _____

_____

C. I. F. (companies) or N. I. F. (individuals): _____

Phone: _____

Email: _____

Signature: _____

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10 Recent courses


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11 What do they think of our training course?

"El curso de Composites de Resinas Castro, liderado por Alejandro y su experto equipo, es magnífico en todos sus aspectos. Enfocado en el conocimiento teórico clave para entender el uso de los composites. Intenso en la realización de prácticas con muy diversos productos y tecnologías. Profundo en la exposición de experiencias y detalles a tener en cuenta para obtener piezas de calidad. Energético, motivante y generoso a la hora de transmitir el amplio conocimiento acumulado por Resinas Castro a lo largo de sus años de historia e interacción con clientes. Realizar este curso Best-in-Class es una inversión de éxito y de satisfacción asegurados. Enhorabuena a Resinas Castro por ofrecer un curso tan completo y necesario para las empresas y personas con interés en Composites."

Emilio Esteban
Gurit - Global Operations Manager

"Never has a company's slogan been more accurate, "We enhance your skills," and if you didn't know you had them, they help you discover them. From the first call, I have felt welcomed by this company. The best money I have invested in training; great knowledge of the products and methods, excellent documentation, generous practice in terms of material and dedication. But if I have to point out something, it is the subsequent help that the advice after the course provides, and there are things that money can't buy.
In a moment like this, these are significant words. And something very important to me, from the point of view of gender, a treatment beyond excellence."

IRANZU ZORZABALBERE
Uznari Kayaks

4,9 /5
Average rating from our students

11 What do they think of our training course?

I currently work at the training center of the AD Parts group. My job requires me to be constantly training. My experience in the two courses, totaling more than 50 hours, was very positive. Learning new things is always constructive, but when you do it with people who are professional, intelligent, with a healthy sense of humor, and above all, good people, it makes the week of the course fly by. I sincerely believe that the world of composite materials has a lot of potential in the job market. Another thing I greatly appreciated is the attention I received when I needed to make any inquiries. They have no obligation to provide guidance after the course, yet they do so with professionalism and kindness.

Would I recommend the courses from Resinas Castro? Without a doubt!

CARLOS FERNÁNDEZ PIÑEIRO

AD Parts

4,9 /5

Average rating from our students

11 What do they think of our training course?

The specialisation course in carbon from Castro Composites was decisive in professionalising the trade in our company. After spending a long time learning in a self-taught manner, conducting tests, developing products, etc., being able to share our doubts hand in hand with the masters of Castro Composites was what allowed us to make the definitive leap to be in a professional world where the demand for quality is maximum.

URKO LARRAÑAGA
123sonar

A well-known slogan says: "Power is nothing without control." Similarly, no matter how much enthusiasm and effort one has, if there is no proper learning, your project will hardly succeed. In this regard, the Composite Materials Courses at Castro Composites laid the foundation to channel all that energy in the right direction. With solid and quality training, the path has been much easier. After many months of self-taught work, I decided to take their Composite Materials courses. I had barely been in the course for a day when I realised 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 is not just recommended, it is essential. I will be eternally grateful to the Castro Composites team.

DAVID SEGADE FREIRE
Karbonius Composites

4,9 /5
Average rating from our students

In 2016, combining my passion for aeronautics, emerging technologies, and the expansion of the agricultural industry, I saw a business opportunity in the development of an unmanned aircraft for aerial application.

Seeing that the aeronautics industry in general was increasingly shifting towards construction with composite materials, I decided at the beginning of 2017 to look for a course that would allow me to delve into the knowledge, handling, and characteristics of this technology.

After conducting an internet search and defining the alternatives based on location, date, language, and content of the available courses, I wrote to a couple of companies. After receiving the kind response from Chola Araujo, and given that they had a specific course on Carbon Fibre and Pre-impregnated, I decided on Castro Composites.

The truth is that I can only say good things about the course, and it positively surprised me in many aspects:

- ***The organisation**, solving the problem of accommodation and meals at reasonable costs according to the circumstances. **The***
- ***transfer from the hotel to the Castro Composites facilities**, handled by Pedro, who not only picked us up every morning but also shared all his experience and expertise in handling composite materials with his excellent humour and willingness.*
- ***The theoretical lectures** in the hands of the owner himself, Alejandro Castro, extremely passionate, with knowledge not only vast but also permanently updated.*
- ***The printed notes** that were given to us, a very complete and didactic summary of much of what we saw, still serve me today as a help for any doubt that arises when putting the knowledge into practice.*
- ***The lunches and snacks** of high quality, abundance, and variety (far above what was expected).*
- ***The variety of practices**, which allowed us to see that all those incredible products you see in photos, and that seem like they are from NASA or a leading global factory, are within our reach with the appropriate knowledge and materials.*
- ***The abundance of materials and equipment** that were provided to us so that each of us could carry out various practices, often even based on our own desires to learn and experiment.*

I was surprised by the commitment of Alejandro Castro and his friendly team to the group's learning. And I found it very interesting that in addition to the courses, the company is a supplier of inputs for this industry, which means that they are not only very up-to-date with advances and news regarding new materials, but they can also recommend specific solutions based on the available materials or even obtain materials based on the client's needs.

I must say with pleasure that after the course I kept in touch with Alejandro, I even made a significant purchase of materials from him for this project, and I have always been able to count on his advice for specific inquiries with the willingness to provide solutions in a completely selfless manner.

In summary, the course at Castro Composites exceeded my expectations, and made every Euro invested in it worthwhile, not only leaving us with valuable knowledge but also opening a door with a supplier/friend, who is up to date and can advise and provide us with everything traditional and new.

SANTIAGO LANDI
Grupo Euro

Unmanned aircraft for field spraying work carried out by Grupo Euro




CASTRO
COMPOSITES

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