

EJEA 
COMPOSITES

-We know how-

COMPOSITE TAILORED MACHINES



**INTERNAL
R&D
LABORATORY**

ESEA COMPOSITES

-We know how-

ESEA is the partner for developing new automatic manufacturing processes for advanced composite materials, managing the entire process and handling various technologies for applications in aerospace, defense, energy, H2, and other industrial sectors.

Since its founding in 1980, ESEA has installed more than 700 custom production and testing machines.

ESEA is a global supplier in the USA, Japan, France, the United Kingdom, Germany, Sweden, Russia, China, India, Argentina, Korea, and many other countries.

ESEA produces high-quality TOW PREG machines, FILAMENT WINDING machines (FW), AUTOMATED FIBER PLACEMENT (AFP) machines, and TESTING machines (HYDRO-CYCLE-BURST) also for H2 CPV (type IV).

The headquarters of Gruppo ESEA are located in Cepagatti (Pescara), in a 15,000 square meter facility. It houses the mechanical, electrical, and software technical offices, as well as production, R&D, testing, assembly, and service departments.

The ESEA service department is able to support its customers during commissioning on-site, offering remote assistance via augmented reality.

Our 150 skilled employees, along with our manufacturing competences and engineering leadership, have driven our success and will continue to do so in the future.

-We know HOW-

R&D LABORATORY

Our R&D Laboratory for **composite materials** is the intersection of innovation and precision.

We are leaders in the research and development of composite materials, offering a wide range of tests and processes for the **creation and testing of products**.

Within our laboratory, both manual and automated production processes can be performed using **dry fiber** or **pre-impregnated fiber**.

This allows for the creation of products and samples through manual layup or by utilizing our advanced **Filament Winding and AFP (Automated Fiber Placement)** machines for rapid prototyping.

Additionally, our laboratory is equipped with a **Tow Preg machine** capable of impregnating dry fiber with various types of resin. This process ensures precise control of resin content, enhancing the quality and consistency of the final products.

The impregnated spools produced in our laboratory can be tested to determine material characteristics or used directly for deposition.

Our specialized staff is available to assist customers in developing and defining the characteristics of their production processes, providing customized solutions for every need.

We support customers at every stage of the process, from prototyping to final production, ensuring high-quality results and reduced time-to-market.

• Reserch & development partners



Centro Italiano Ricerche Aerospaziali



Centro di ricerche europeo di tecnologie, design e materiali



UNIVERSITÀ DEGLI STUDI DI SALERNO



UNIVERSITÀ DEGLI STUDI DELL'AQUILA



TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA



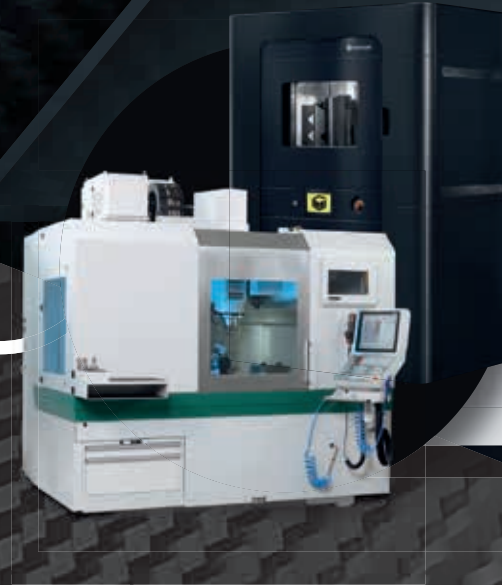
SAPIENZA
UNIVERSITÀ DI ROMA
Scuola ingegneria Aerospaziale

INTERNAL R&D LABORATORY

Manual process

Hand Lay-up with DRY or PRE-IMPREGNATED fiber

This process consist of applying layers of resin and fabric, with air bubbles being removed between each layer, until the desired thickness is achieved.



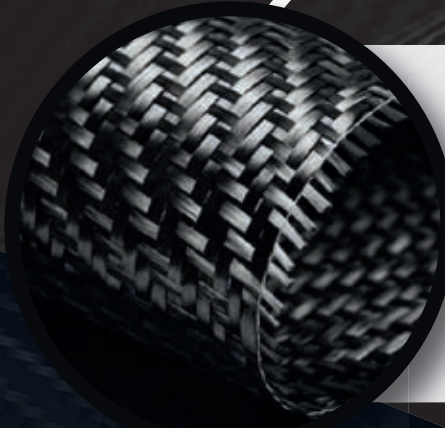
3D Printing / CNC

In the manual production process, **3D printing and CNC** are used for the creation of complex molds and inserts from **thermoplastics materials, aluminum and Steel**.

Preparation for polymerization

For **substantial improvement in molding quality**, our staff are specialized in the use of:

- Perforated Release Films • Aerators and Absorbers
- Vacuum Bag Films • Bag Sealant Tapes
- Adhesive Tapes • Vacuum Tubes • Connectors • Pumps



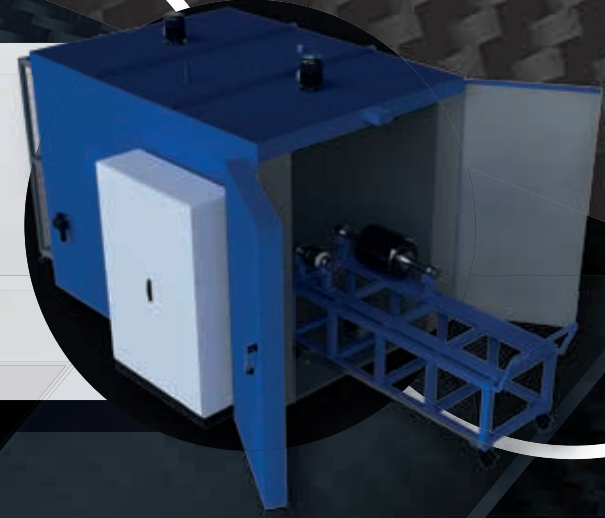
Vacuum infusion

The "**vacuum infusion**" process consists of applying layers of **dry fiber** followed by the infusion of resin under vacuum.



Polymerization in oven

The use of a high-temperature oven (**400 °C**) allows for the curing of the manufacts with maximum performance.



Final Controls

At the end of the process, the finished manufacts will be tested through **Non-Destructive Testing (NDT)**, as:

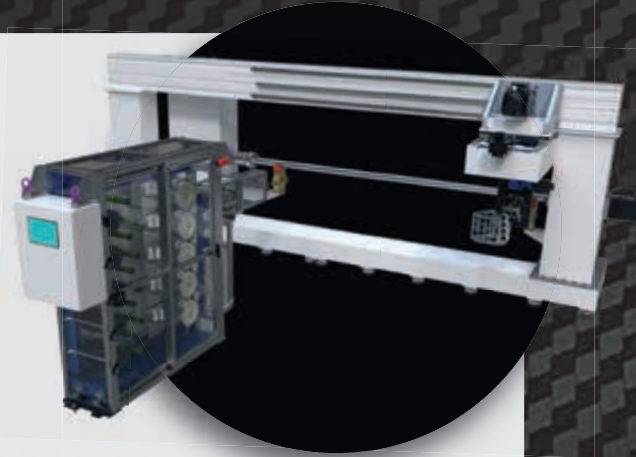
- Heat Deflection Temperature (**HDT**)
- Glass Tension Temperature (**Tg**)
- Ultrasonic Test

INTERNAL R&D LABORATORY

Automatic process

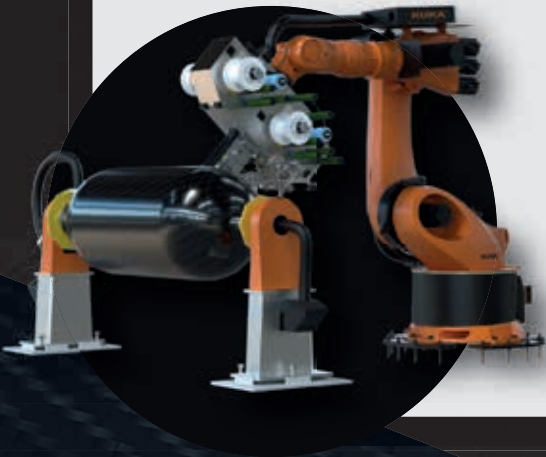
Deposition with FW

The **Filament Winding machine (FW)** allows for the production of tubular structures and **CPV (Composite Pressure Vessel)** tanks with a diameter of up to 1 meter and a maximum length of 4 meters.



Deposition with AFP

The **AFP machine** allows for the lamination of complex parts thanks to the presence of a **6-axis robot** and a **horizontal positioner**.



Burst test

The automatic **Burst test machine** allows for the verification of the burst resistance of the tank using water at room temperature.



Preparation for polymerization

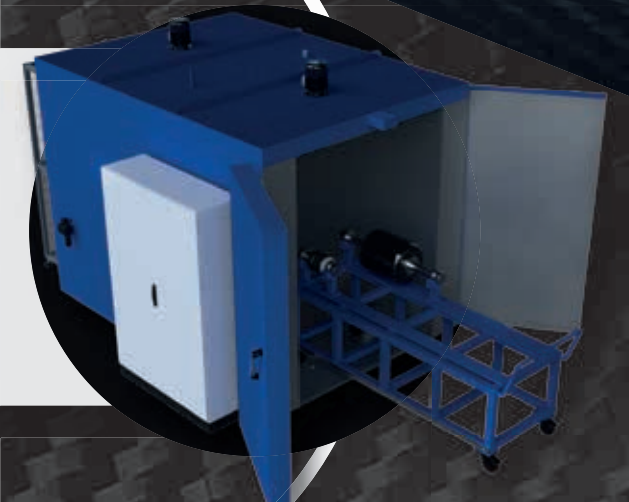
For **substantial improvement in molding quality**, our staff are specialized in the use of:

- Perforated Release Films • Aerators and Absorbers
- Vacuum Bag Films • Bag Sealant Tapes
- Adhesive Tapes • Vacuum Tubes • Connectors • Pumps



Polymerization in oven

The use of a high-temperature oven (**400 °C**) allows for the curing of the manufactures with maximum performance.



Final Controls

At the end of the process, the finished manufactures will be tested through **Non-Destructive Testing (NDT)**, as:

- Heat Deflection Temperature (HDT)
- Glass Tension Temperature (Tg)
- Ultrasonic Test



OUR MACHINES

COMPOSITE TAILORED MACHINES

EFESTO

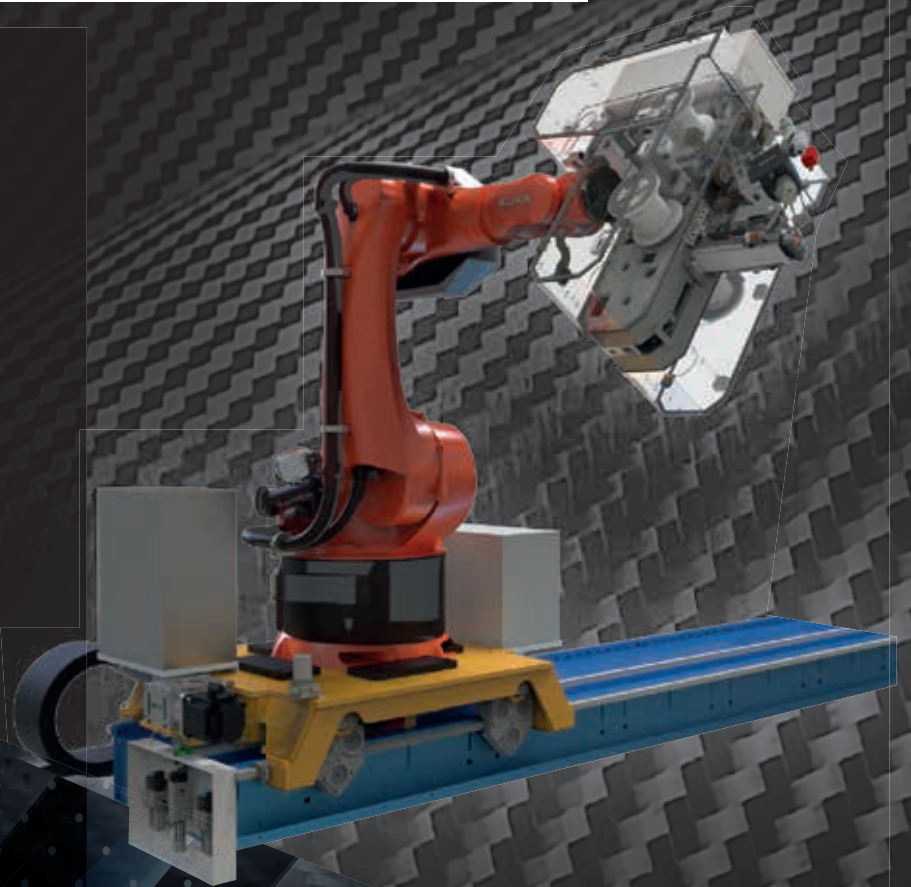
Automatic Fiber Placement (AFP)

ESEA modular AFP head has demonstrated high productivity and high quality in the aerospace production.

This innovative AFP head has been developed to optimize the capability to work on complex convex and concave structures. The user friendly programming software supports tailored trajectories to ease the production.

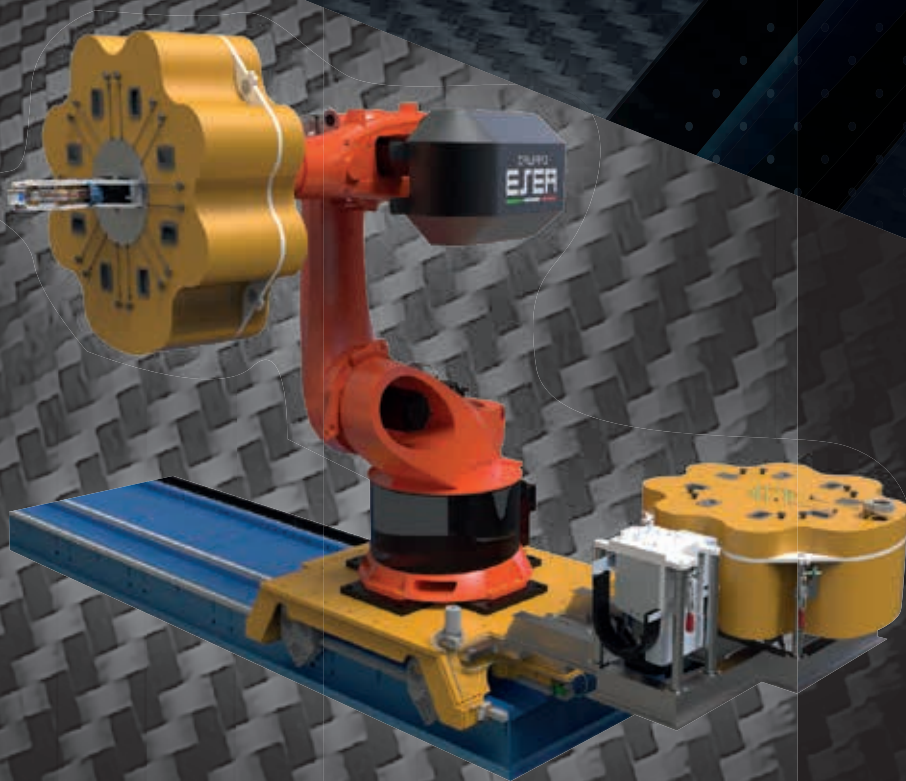
The EFESTO head improves the technology by using:

- different sizes of slittape or towpreg in one head
- rapid set-up
- high laying accuracy
- high productivity in production



ATENA

Anisogrid Filament Winding (FW)

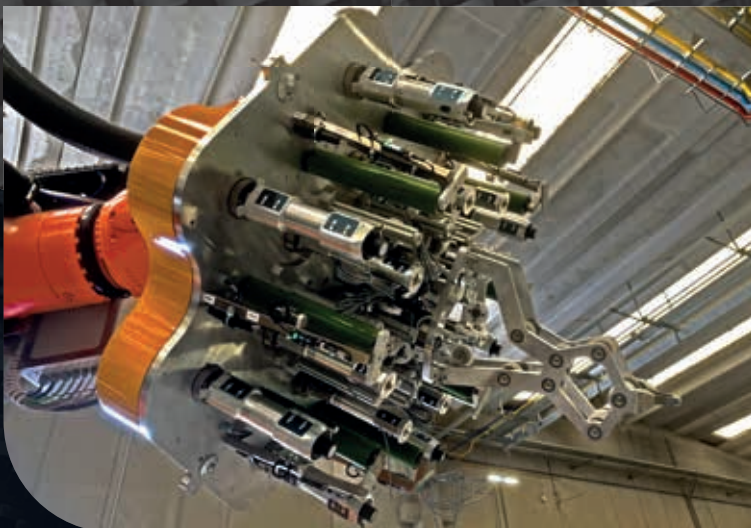


ESEA Anisogrid filament winding is used to manufacture complex shape and high quality parts. ESEA robotic filament winding technology guarantees the minimum stress of the towpreg during the laying.

ESEA anisogrid filament winding is suitable for:

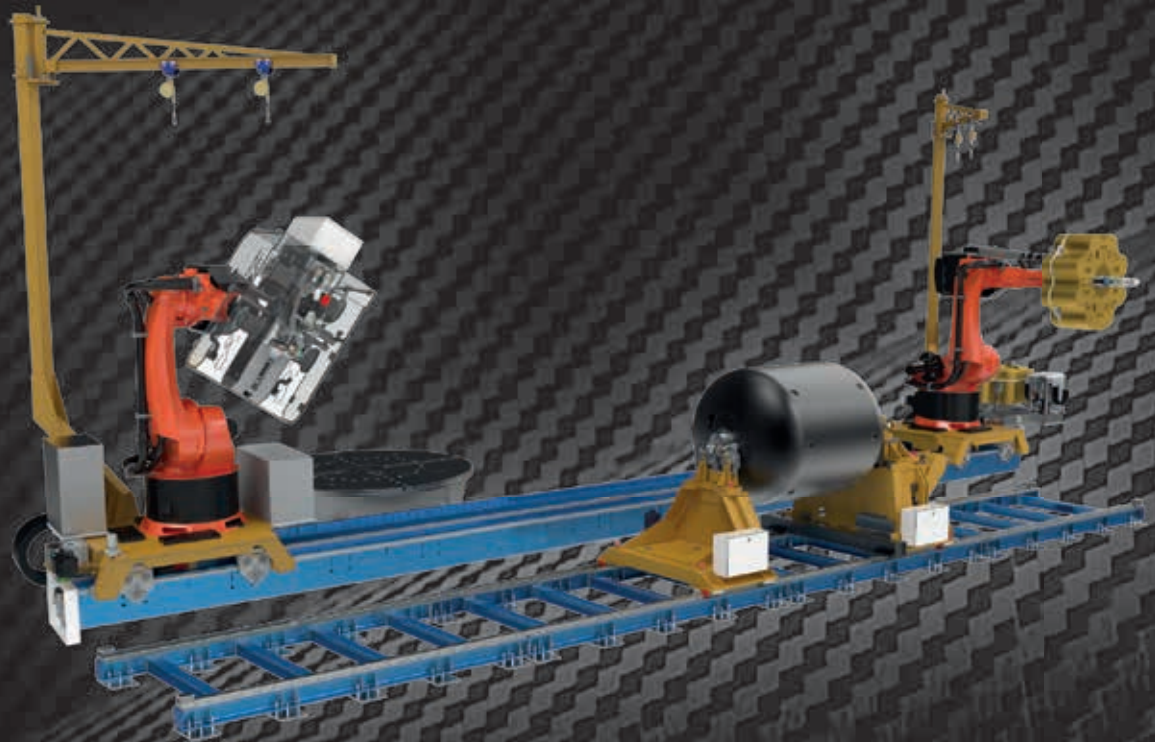
The production of ANISOGRID COMPOSITE LATTICE STRUCTURES FOR SPACECRAFT made of regular lattice of intersecting hoop and helical ribs by the filament winding technology. Placement of towpreg and dry fibres along the load direction.

It represents an advantage as regards process control, repeatability and manufacturing times.



ARES

AFP – FW – MILLING Machine



Innovative integrated AFP – FW – MILLING MACHINE for the production of cryogenic vessel in composite for aerospace application (type IV and type V).

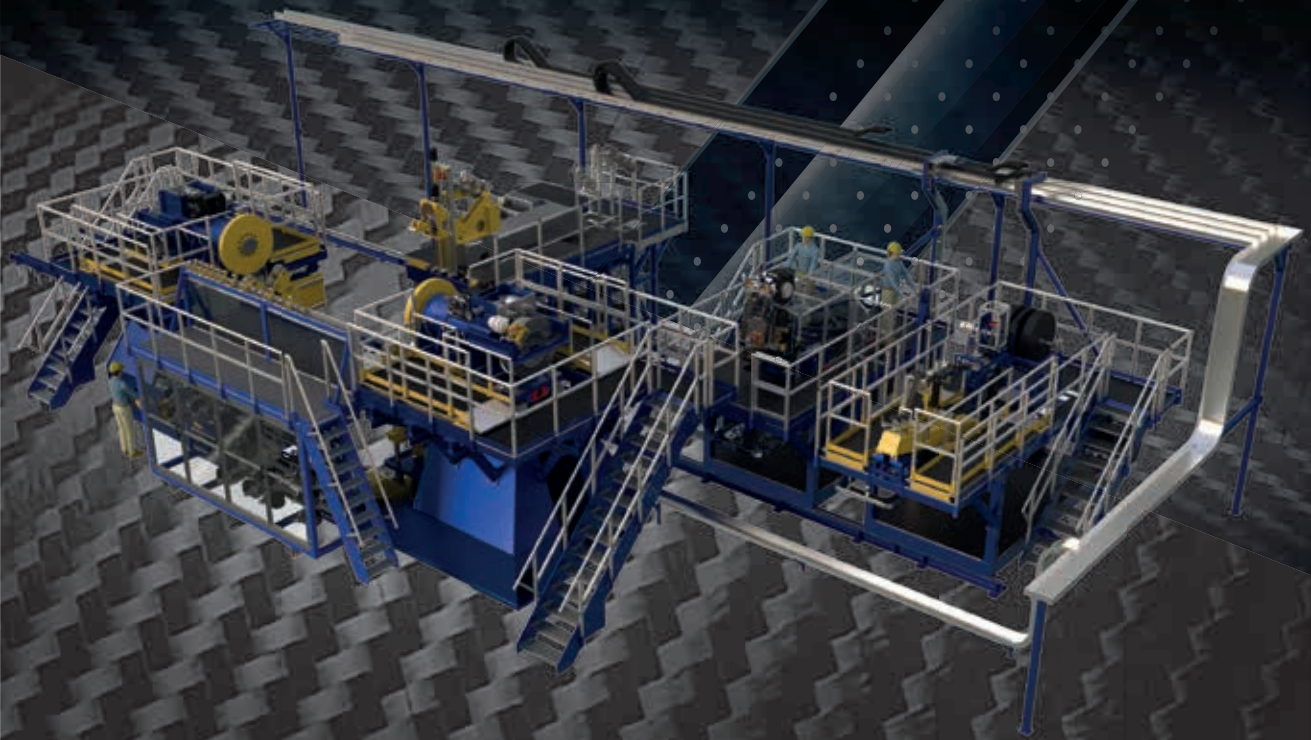
The development aerospace application of a modular AFP head increase the capability of the machine to produce complex, convex and concave parts, using innovative trajectories.

ESEA robotic filament winding is suitable for:
the production of ANISOGRID COMPOSITE LATTICE STRUCTURES FOR SPACECRAFT made of regular lattice of intersecting hoop and helical ribs by the filament winding technology.
Placement of Towpreg and dry fibres along the load direction.



ZEUS

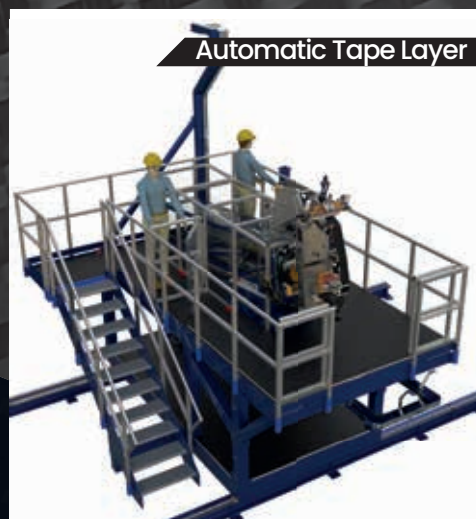
Filament Winding Platform Machine



Automatic machine to produce composite pressure vessels for aerospace applications. This advanced machine is designed to integrate multiple manufacturing processes on the same components, ensuring efficiency and precision in production.

The machine's capabilities include: Filament winding of towpreg 30 spools, Tape Winding, Automated Tape Laying (ATL) with different bandwidth of UD tape.

By combining these processes into a single machine, it is possible to streamline production, reduce lead times, and improve the quality and consistency of the composite pressure vessels produced. This integration also allows for greater customization and adaptability in the manufacturing process, catering to the specific needs of different aerospace applications.



POSEIDONE

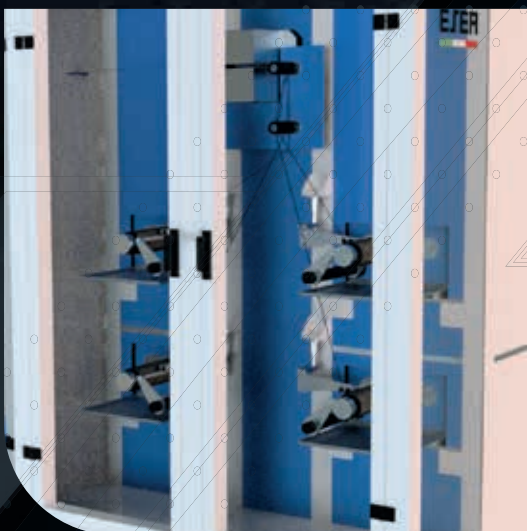
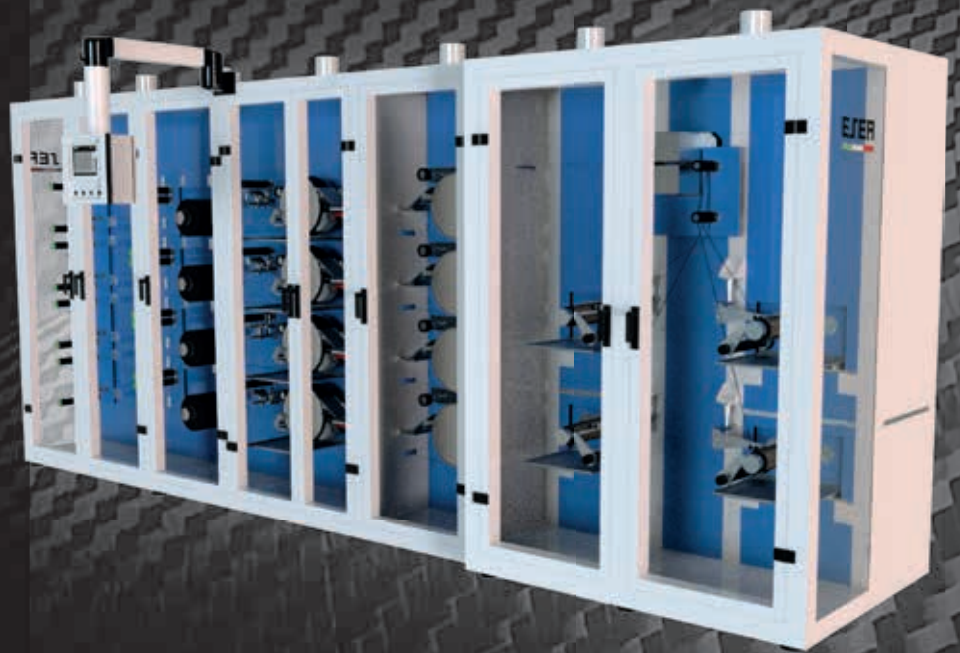
Tow Preg – Industrial

Industrial impregnation machine to produce high quality Tow Preg. ESEA's impregnation technology guarantees a constant resin fraction with deviation of less than $\pm 0,4\%$.

The maximum machine speed is 200 m/min. (3,3 m/s.)
The machine is able to process different resins with different viscosities.

Moisture and temperature control for the rewinding section.

Tailored machine sizes for 4 to 8 spools.



ERMES

Tow Preg – Lab Scale



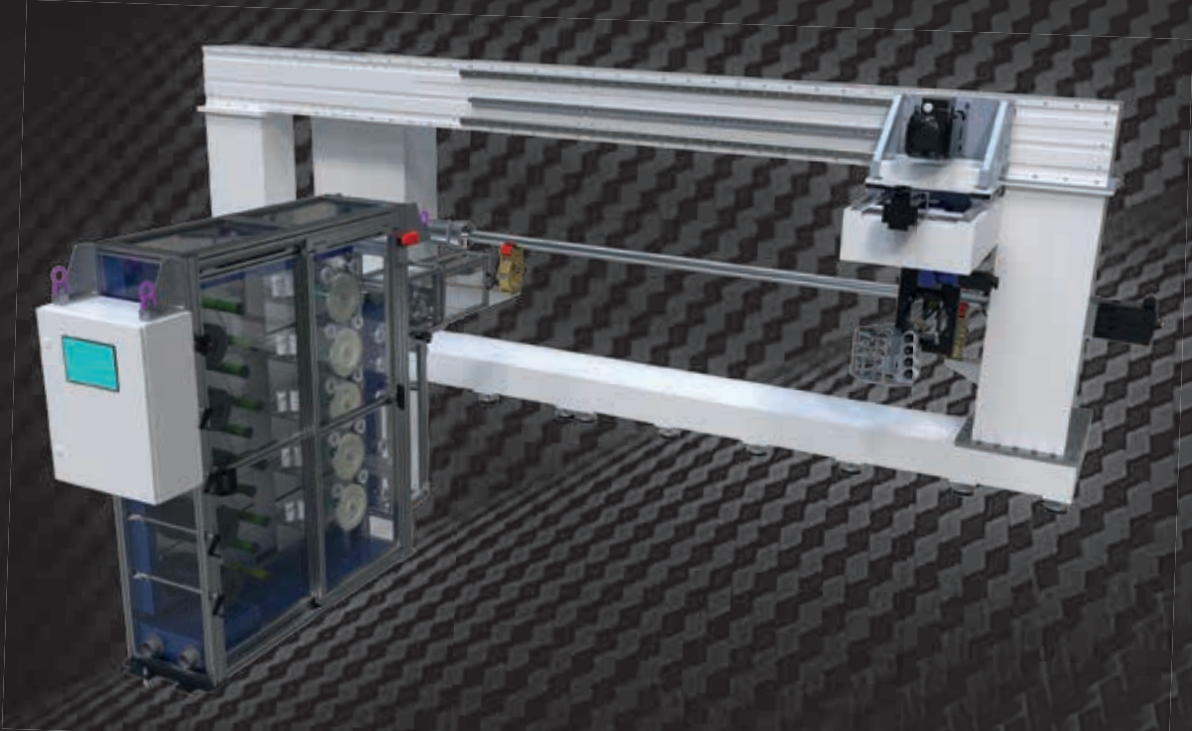
Lab Scale impregnation machine to produce high quality Tow Preg. ESEA's impregnation technology is able to guarantee a constant resin content with deviation less of $\pm 0,4\%$.

The high maximum process speed is estimated at around 200 m/min. The machine is able to process different resins with different viscosities.



APOLLO

Filament winding – Laboratory



Automatic machine to produce composite pressure vessels for aerospace applications. This advanced machine is designed to integrate multiple manufacturing processes on the same components, ensuring efficiency and precision in production.

The machine's capabilities include: Filament winding of towpreg 30 spools, Tape Winding, Automated Tape Laying (ATL) with different bandwidth of UD tape.

By combining these processes into a single machine, it is possible to streamline production, reduce lead times, and improve the quality and consistency of the composite pressure vessels produced. This integration also allows for greater customization and adaptability in the manufacturing process, catering to the specific needs of different aerospace applications.



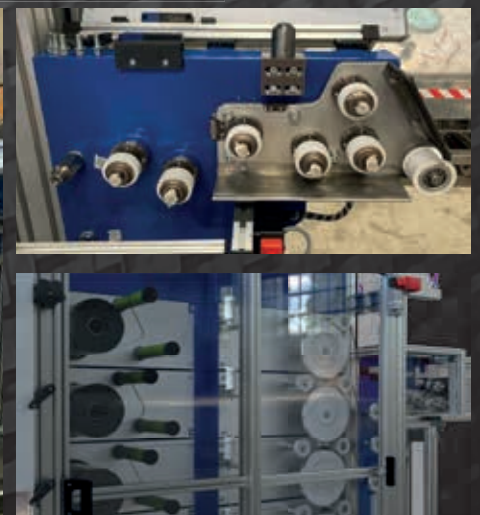
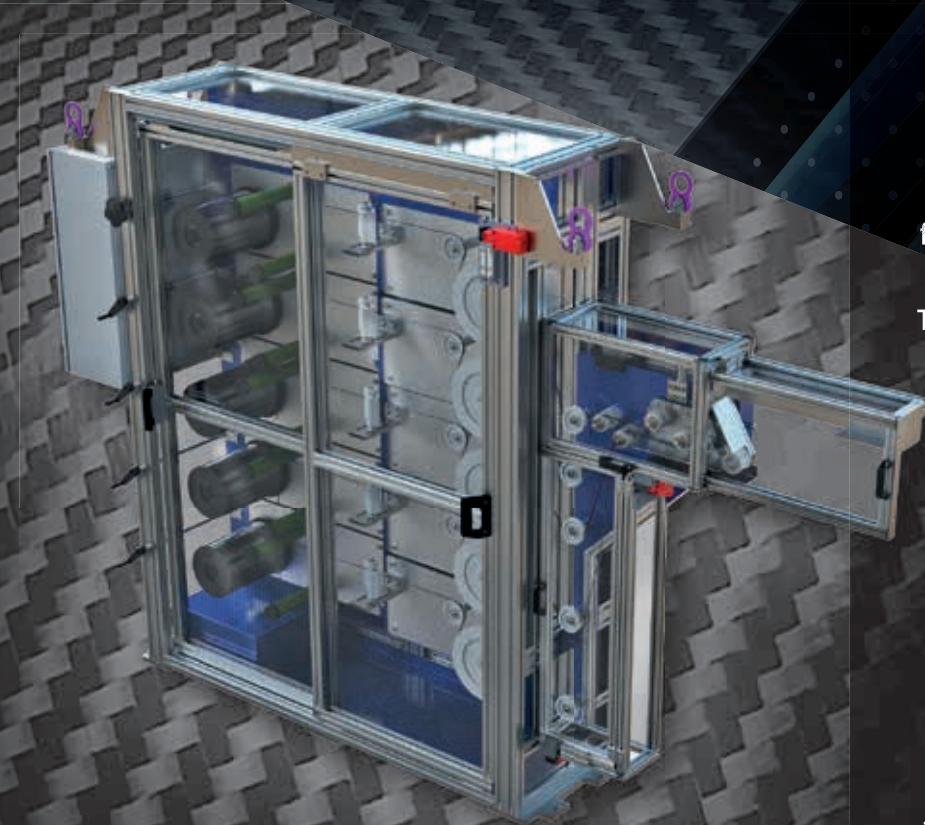
CRONO

Delivery System

The hydraulic system for Cycle/Hydro testing is designed for vessel up to 2.500 liters and ensures a series of accurate and reliable tests. It utilizes a filtered industrial testing fluid with a minimum granularity of 20 microns, introduced into the vessel. The maximum test pressure is tailored to according to customer specification as the time for each cycle.

To power the system, service air at a pressure of 7 bar is required. The pressurization system is designed to operate on a single test station, ensuring precise and uniform control during each phase of the process.

The estimated cycle times depend on the Vessel volumes.



ARTEMIDE

Hydro/Cycle test Machine

The hydraulic system for Cycle/Hydro testing is designed for vessel up to 2.500 liters and ensures a series of accurate and reliable tests.

It utilizes a filtered industrial testing fluid with a minimum granularity of 20 microns, introduced into the vessel. The maximum test pressure is tailored to according to customer specification as the time for each cycle.

To power the system, service air at a pressure of 7 bar is required. The pressurization system is designed to operate on a single test station, ensuring precise and uniform control during each phase of the process.

The estimated cycle times depend on the Vessel volumes.



DEMETRA

Burst Test Machine



Automatic machine for the “burst test” of composite pressure vessel.

The use of ESEA’s **BURST TEST STAND** is the bursting of composite pressure vessels by using water under ambient conditions.

The vessel will be pressurized up to the burst or target pressure maximum
2.500 bar

APPLICATIONS:
Batch testing of composite pressure vessels
Qualification and homologation of composite pressure vessels.



EJEA 
COMPOSITES

-We know how-

www.gruppoesea.it



National and European projects

Ministero dell'ambiente
e della Sicurezza Energetica



In collaboration with:



Ministero delle imprese
e del made in ITALY



PROGETTO
SIDRO

SIDRO project aimed at the development of "innovative technologies for the storage and transport of hydrogen"

PROGETTO
LAMBDA

The **LAMBDA-M project** emerges as a significant innovation in the aerospace sector, aiming to create a large self-deploying reflector.

PROGETTO
AUTOCOMP

Innovative solutions for compression, moulding, induction welding for thermosetting and thermoplastic composite materials.



We know how

GRUPPO ESEA

Via Nazionale, 56/A - 65012 Cepagatti (PE) - ITALY

Tel: +39 0871562636

E-mail: info@gruppoeesa.it

Homepage: www.gruppoeesa.it -