COMPOSITE INTEGRATION

Pioneering COMPOSITE Manufacturing SOLUTIONS

FOR YOU WE ARE EXPLORERS, ENGINEERS & ENABLERS

EXPLORE New frontiers in Resin Transfer Moulding & Composite Infusion

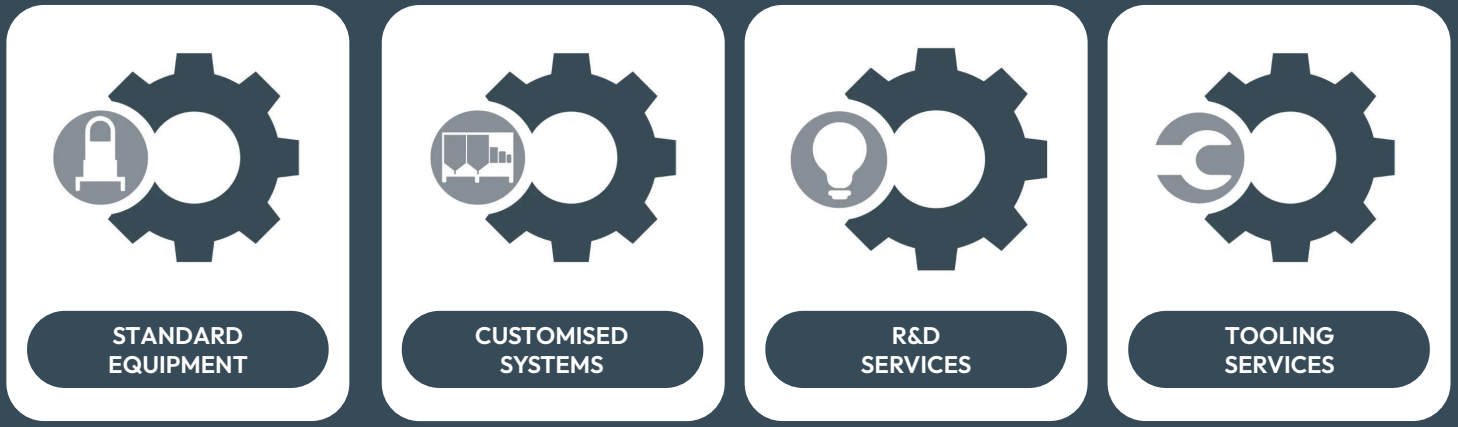
At Composite Integration we are driven by a core conviction 'there's always a better way.' We care about your success.

No matter how complex your objectives, or how ambitious your projects, our team is committed to equipping you with the finest tools, processes, and expert knowledge needed to excel in composite manufacturing.

Our focus is not just to provide you with services and equipment; we want to help extend your capabilities and push the boundaries of what is possible through:

NEXT GENERATION COMPOSITES

Lead the Way with **Advanced Resin Mixing** and **Injection Machines** designed for **Direct Infusion**, **RTM**, and **VRTM**.



PIONEERING COMPOSITE MANUFACTURING SOLUTIONS

ENGINEER With Precision using CIJECT® Resin Injection Machines

From small-scale production to large-scale R&D challenges, our CIJECT® range of resin mixing and injection equipment gives you the power to produce high-quality parts more efficiently, consistently, reliably, and with less waste.

The RTM (Resin Transfer Moulding) and infusion process can be complex, but our software and machines are not. They are clear and simple to use, with the ability to manufacture the most complex of designs.

Our CIJECT® machines are also incredibly reliable,

'some customers are still running machines we built for them 21 years ago'

ENABLE Change in Your Industry

If you have a challenge to manufacture anything composite, others may sell you the equipment, but we go further.
Our team provides onsite installation and ongoing support throughout your project, ensuring you produce only the highest quality parts.

Our machines and expertise have enabled our customers to achieve ground-breaking manufacturing results, including:

- Large ocean-going luxury yacht hulls
- World's first single-piece helicopter fuselage
- World's largest wind turbine blades, 100M +

WHY CHOOSE COMPOSITE INTEGRATION?

Ultimate Control
Our machinery empowers clients with precision throughout the composites process, enhancing both efficiency and quality.

Innovative Leadership
Pioneers of the Direct Infusion process, our advancements set industry standards and push technological boundaries.

Reliability and Longevity
Our CIJECT® machines are built to last, proven by over two decades of operational excellence.

Customer-Centric Innovation
We are not just suppliers; we are partners in your quest for unparalleled composite solutions.

Proven Success
Trusted globally, our equipment has been instrumental in producing some of the most innovative projects in the world, from luxury yachts to groundbreaking aerospace components.

At Composite Integration, we share a pioneering spirit with our customers, revolutionising the process of composite manufacturing together.

If you have a challenge to produce something for the first time, others may sell you the machines to do it, but we go further. We share our knowledge and expertise in Resin Transfer Moulding, and the Direct Infusion process we pioneered in the early 2000s.

Whatever your goals, whatever your ambition, we're here to make sure you have the right equipment, processes and expertise to succeed in your **'quest for the best'**

COMPOSITE INTEGRATION

APPLICATIONS

RESIN TRANSFER MOULDING (RTM)

What is Resin Transfer Moulding (RTM)?

Resin Transfer Moulding (RTM) is an advanced composite manufacturing technique used to produce high-quality, dimensionally accurate components. This involves injecting liquid resin into a closed mould where the fibre reinforcement material has been placed, ensuring thorough impregnation of fibres under pressure.

Key Features of RTM

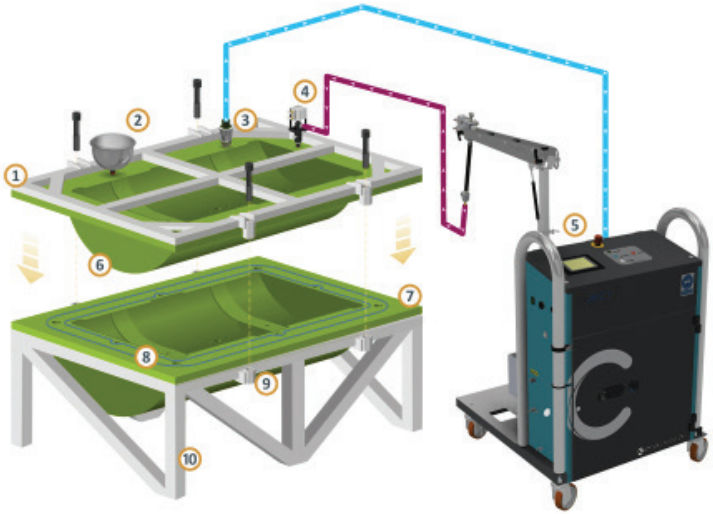
Precision
Offers excellent control over resin content and fibre placement, ensuring parts with consistent properties and minimal void content.

Quality Finish
Achieves a smooth finish on both sides of the part, reducing post-processing work.

Versatility
Adapts to various materials including glass, carbon, and aramid fibres, suitable for producing complex shapes.

Scalability
Suitable for both small batch production and large-scale manufacturing.

TYPICAL RTM SET-UP



1. Support frame - lightweight metal
2. Catch-Pot - waste removal
3. Sensor monitoring - data measurement
4. Injection valve - resin input
5. CIJECT® 2 - resin mixing injection
6. Mould - 'B' surface & injection
7. Mould - 'A' surface
8. Seals - standard groove fitting
9. Clamping point - manual nut/bolt
10. Support frame - steel reinforcement

RTM is invaluable in sectors such as aerospace, wind, marine, automotive, and defence, where component integrity is critical. It allows precise control over resin and fibre ratios, optimising the performance characteristics of the final product.

VACUUM RESIN TRANSFER MOULDING (VRTM)

What is Vacuum Resin Transfer Moulding (VRTM)?

Vacuum Resin Transfer Moulding (VRTM) is a method of producing composite compenents within a vacuum-clamped, two part mould.

Compared with traditional RTM, VRTM tooling is relatively lightweight and thus considerably more economical. Atmospheric pressure is used as the mould closing force, as opposed to the mechanical clamping methods and heavily reinforced mould structures used in RTM.

Key Features of VRTM

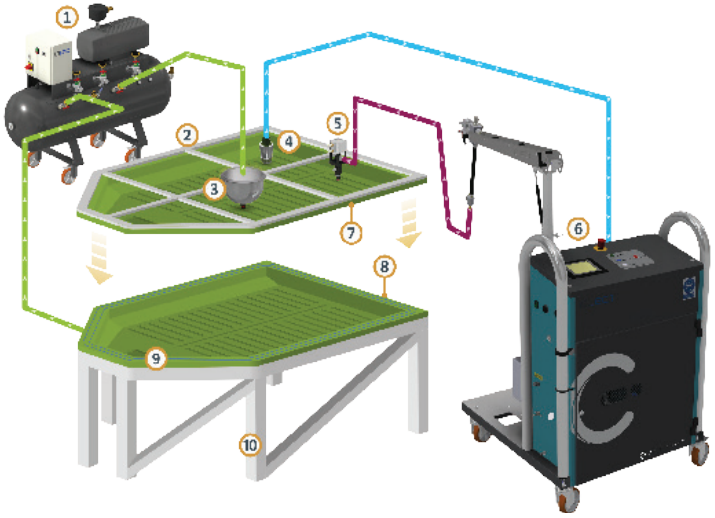
Large Scale Production
Ideal for creating small to medium sized components at higher production rates.

High Quality and Uniformity
Ensures consistent A & B surface quality, and good dimensional accuracy.

Cost Efficiency
More economical due to lower cost, lightweight tooling, in comparison to RTM.

Flexibility
Accommodates various reinforcement materials and resin types, tailored to specific needs.

TYPICAL VRTM SET-UP



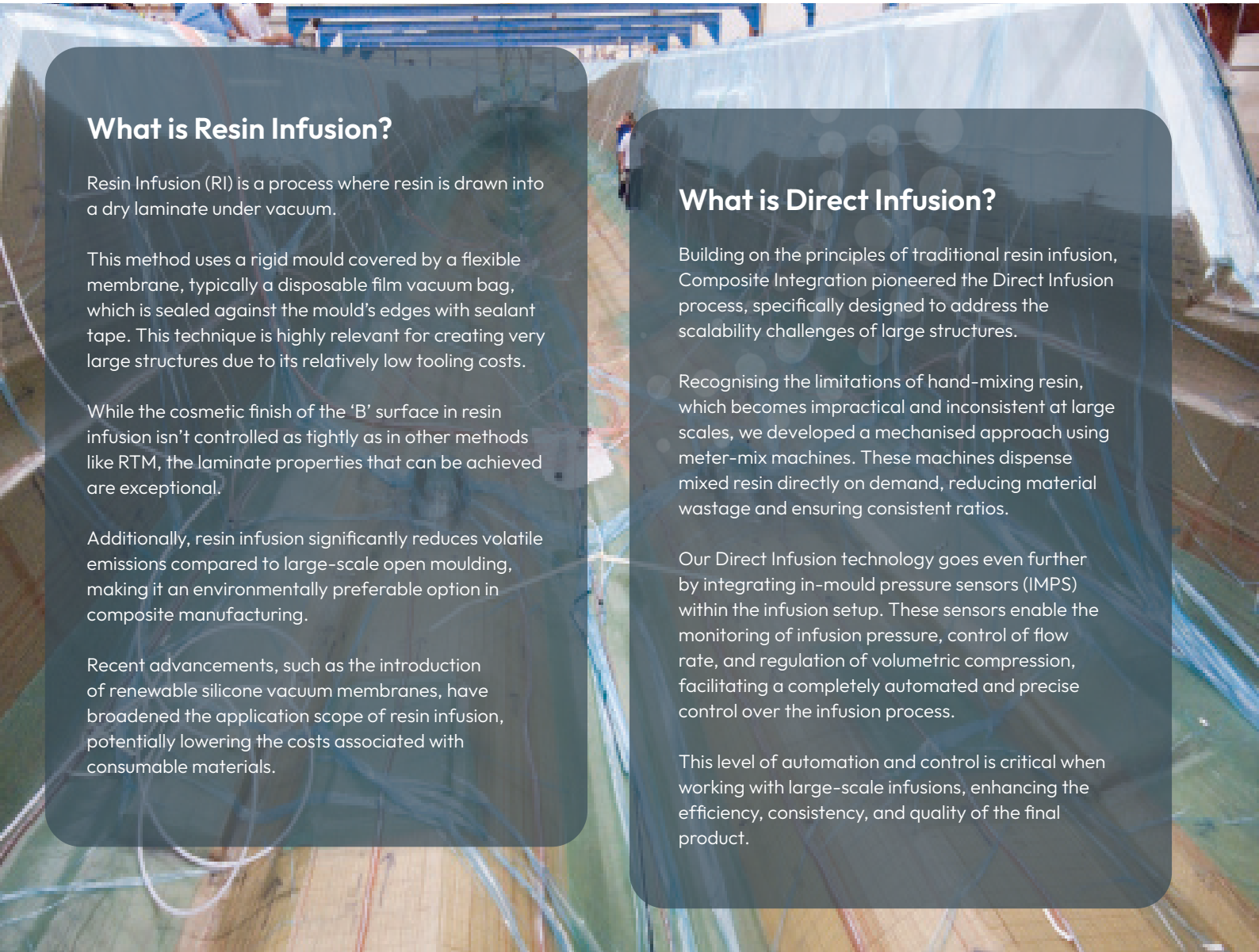
1. Support frame - lightweight metal
2. Catch-Pot - waste removal
3. Sensor monitoring - data measurement
4. Injection valve - resin input
5. CIJECT® 2 - resin mixing & injection
6. Mould - 'B' surface
7. Mould - 'A' surface
8. Seals - standard groove fitting
9. Clamping point - manual nut/bolt
10. Support frame - steel reinforcement

VRTM's capability to maintain quality at scale, makes it preferred for industries needing strong and lightweight composite parts.

RESIN INFUSION (RI)

The Future for Advanced Composite Manufacturing

At Composite Integration, we are dedicated to advancing composite manufacturing technologies through our expertise in Resin Infusion (RI) and our pioneering development of Direct Infusion processes. These innovative approaches have set new standards in the industry, particularly for manufacturing large-scale structures efficiently, and with high-quality outcomes.



What is Resin Infusion?

Resin Infusion (RI) is a process where resin is drawn into a dry laminate under vacuum.

This method uses a rigid mould covered by a flexible membrane, typically a disposable film vacuum bag, which is sealed against the mould's edges with sealant tape. This technique is highly relevant for creating very large structures due to its relatively low tooling costs.

While the cosmetic finish of the 'B' surface in resin infusion isn't controlled as tightly as in other methods like RTM, the laminate properties that can be achieved are exceptional.

Additionally, resin infusion significantly reduces volatile emissions compared to large-scale open moulding, making it an environmentally preferable option in composite manufacturing.

Recent advancements, such as the introduction of renewable silicone vacuum membranes, have broadened the application scope of resin infusion, potentially lowering the costs associated with consumable materials.

What is Direct Infusion?

Building on the principles of traditional resin infusion, Composite Integration pioneered the Direct Infusion process, specifically designed to address the scalability challenges of large structures.

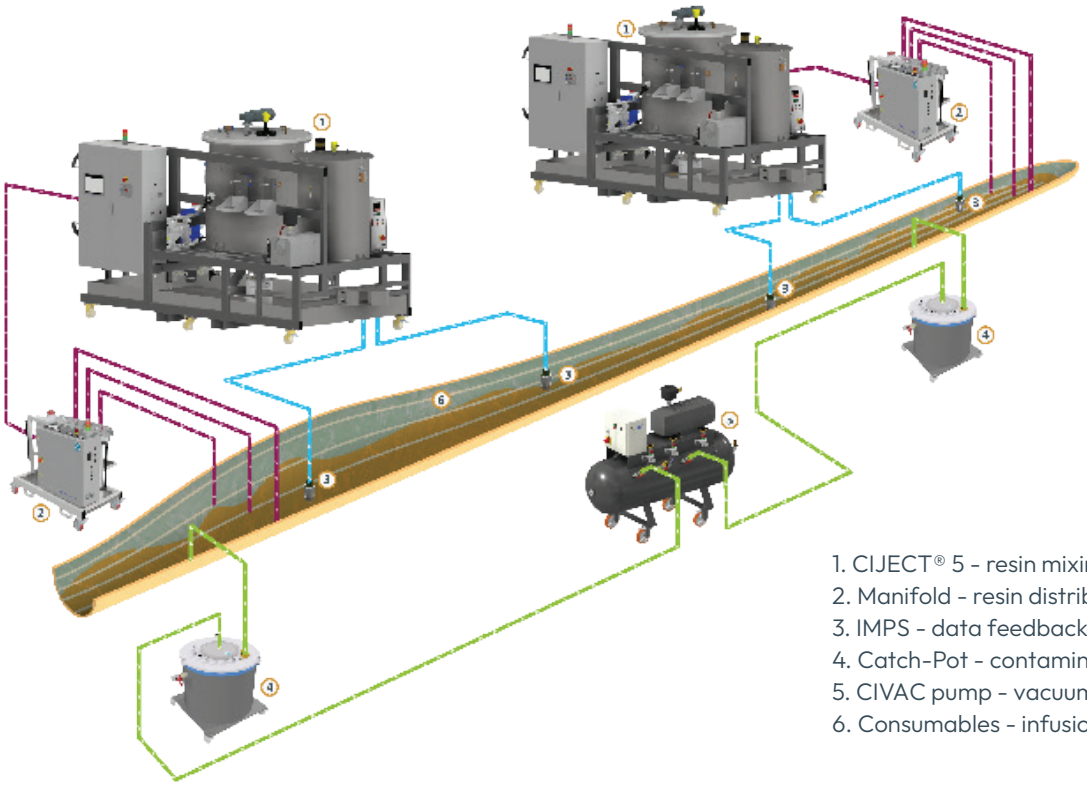
Recognising the limitations of hand-mixing resin, which becomes impractical and inconsistent at large scales, we developed a mechanised approach using meter-mix machines. These machines dispense mixed resin directly on demand, reducing material wastage and ensuring consistent ratios.

Our Direct Infusion technology goes even further by integrating in-mould pressure sensors (IMPS) within the infusion setup. These sensors enable the monitoring of infusion pressure, control of flow rate, and regulation of volumetric compression, facilitating a completely automated and precise control over the infusion process.

This level of automation and control is critical when working with large-scale infusions, enhancing the efficiency, consistency, and quality of the final product.

DIRECT INFUSION (DI)

Typical Direct Infusion System for Large Wind Structure



1. CIJECT® 5 - resin mixing & infusion
2. Manifold - resin distribution
3. IMPS - data feedback & control
4. Catch-Pot - contaminant protection
5. CIVAC pump - vacuum system
6. Consumables - infusion film & PVC

Why Choose Composite Integration for Resin Infusion & Direct Infusion?

Innovative Solutions
Leverage our cutting-edge Direct Infusion technology for unmatched precision and quality.

Cost Efficiency
Our advanced CIJECT® equipment reduces the need for extensive manual labour and material waste.

Enhanced Quality
Achieve superior laminate properties with our controlled infusion processes.

Environmental Responsibility
Benefit from our methods that significantly cut down on volatile emissions.

EXCELLENCE IN RESIN PROCESS TECHNOLOGIES

We specialise in transforming resin processing with our advanced CIJECT® machinery range, harnessing the potential of Epoxy, Polyester, Reactive Thermoplastic, and Silicone resins to set new benchmarks in Composite Manufacturing. Tailored systems for specific resin requirements, ensuring error-free production.

EPOXY RESINS

Superior Strength
Enhanced tensile, shear, & flexural strength for demanding applications.

High Temperature & Chemical Resistance
Maintains integrity under harsh conditions, ideal for aerospace & automotive industries.

Low Shrinkage
Promotes dimensional stability through reduced internal stresses during curing.

POLYESTERS

Cost Effective
Provides affordable solutions without compromising quality.

Quick Curing
Enhances production efficiency with faster curing times.

Versatility
Adaptable for numerous manufacturing processes including hand lay-up and spray-up.

REACTIVE THERMOPLASTICS

Recyclability and High Performance
Offers sustainable solutions, without sacrificing durability.

Efficiency and Adaptability
Ideal for complex manufacturing in automotive & consumer electronics.

CIJECT® Machinery
Precision-engineered to overcome the unique challenges of thermoplastic infusion.

Thermal Stability & Chemical Resistance
Ensures performance across extreme conditions, crucial for electronics & aerospace.

Electrical Insulation
Essential for applications requiring non-conductivity.

SILICONES

Thermal Stability & Chemical Resistance
Ensures performance & quality of final products across multiple applications including: special effects, potting & creative.

Tooling
Used to create reusable vaccum bags and mandrels for composite moulding.

CIJECT® Silicone Spray Machines
Utilise precise positive-displacement piston pumps for optimal silicon infusion.

COMPOSITE INTEGRATION

PRODUCTS

TRANSFORMING COMPOSITE MANUFACTURING

At Composite Integration, we pride ourselves on offering a core range of products that are highly customisable to meet the specific needs of our clients.

Central to our range is CIJECT®, our cutting-edge resin infusion and injection machines, along with advanced process control technologies essential for any composite manufacturer.

Engineered with flexibility at the forefront, our core products can be tailored to accommodate unique manufacturing requirements, various production scales, and stringent industry standards.

Our approach allows clients to begin with a robust, proven system, which can then be enhanced through a selection of modules and options.

Whether adapting to different resin types, fitting complex mould geometries, or incorporating advanced real-time monitoring technologies, our products are designed to evolve alongside the dynamic demands of our clients' projects.

This customisation capability ensures that our solutions not only meet the immediate needs of our customers but also equip them to adapt and expand, as their future challenges and opportunities in composite manufacturing arise.

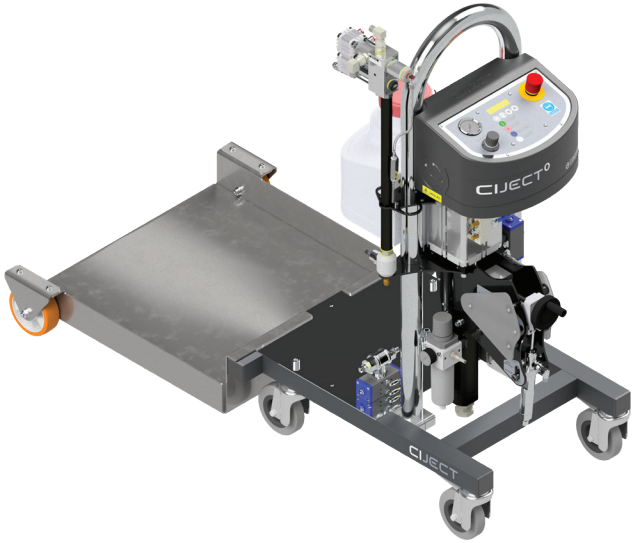
CIJECT® machines have been described as the 'Mercedes of the market', giving customers ultimate control over the entre composites process.

CIJECT 0

CIJECT® 0 is an entry level two component resin mixing and injection machine.

This machine is is very simple to operate, very easy to maintain and incredibly reliable.

With a maximum output of up to 10Kg/min it issuitable for RTM, VRTM and small infusions.



Key Features

- A simple and effective manual control system – very easy to operate.
- Onboard Flush system with gel alarm – quick and efficient cleaning.
- Purpose designed piston pumps – very reliable & easy to maintain.

Applications

- RTM of boat hatches.
- VRTM of van panels & roofs.
- Small infusions.

CIJECT 1

CIJECT® 1 is a two-component workshop machine that provides extensive levels of control yet retains very simple operation.

With programmable injection recipes and alarm monitored gel timer it minimises the need for operator input throughout the process.

Suitable for polyesters, vinyl esters, and epoxy resin systems.

Key Features

- PID controlled injection pressure – ensures continuous, uniform positive injection pressure.
- Pre-injection vacuum test – ensures vacuum integrity prior to injection.
- Fixed solvent & catalyst tanks with storage area for hardener and drum trolley for resin – a practical self-contained “injection unit”.

Applications

- RTM of manhole covers.
- VRTM of modular building components.
- VRTM with silicone bags of van roofs.

CIJECT 2

CIJECT® 2 is a high-performance two component resin mixing and injection machine designed for applications requiring levels of control and verification.

With multi-stage programmable recipes, A & B component flow meters and In Mold Pressure Sensors (IMPS), the CIJECT 2 will manage the injection process to ensure that the same injection parameters are repeated time after time.

Suitable for polyesters, vinyl esters, and epoxy resin systems.

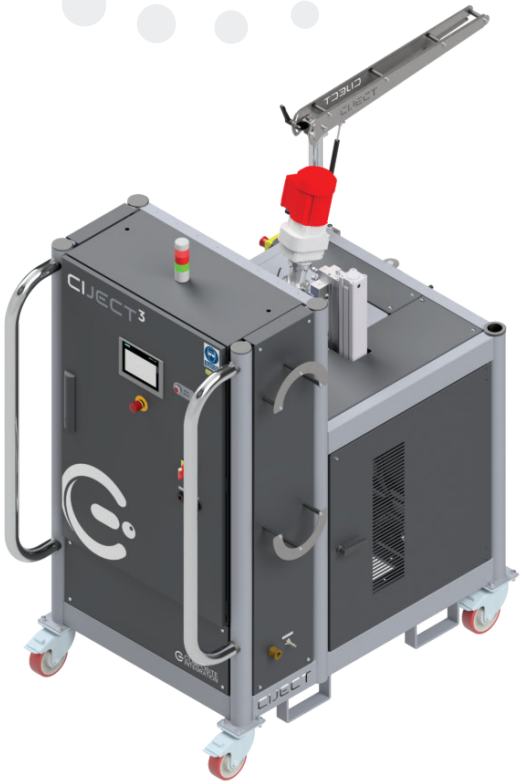
Key Features

- Advanced powerful PLC that enables unrivalled levels of control.
- WiFi functionality enables remote monitoring and data logging – increasing the efficiency of operatives.
- RFID scanner to enable auto ID of injection parameters – minimises the reliance on operator input.
- Option for integrated material conditioning tanks – a single point of control for complete process management.

Applications

- RTM of high performance composites.
- VRTM of wind turbine nacelle components.
- Infusions up to 1200 kg.

CIJECT 3



CIJECT® 3 is an advanced pressure-pot machine designed for pre-mixed or single component resin systems.

Originally developed for R&D and lab-scale processing, the CIJECT® 3 has been developed further to meet the requirements of the aerospace and other hi-tech composite manufacturing industries.

These machines allow different resin systems to be prepared (i.e. heated, mixed, degassed) and then dispensed, very accurately, without the need to clean and re-prime a mechanical pumping system.

Key Features

- Fully heated, PID controlled resin circuit to ensure process parameters are maintained.
- Integrated vacuum pump to enable materials degassing and mould evacuation.
- Closed loop PID pressure control – Automatic, regulated tank pressure to achieve desired pressure in mould.

Applications

- R & D materials testing.
- University laboratory projects.
- High specification prototypes.

CIJECT 4

CIJECT® 4 is a robust machine designed for high flow applications.

With a 200cc double acting piston pump the CIJECT® 4 is able to achieve 20Kg/min whilst maintaining accurate ratio control.

Key Features

- A & B component flow meters to ensure accurate ratio control throughout the infusion.
- Remote monitoring capability enabling optimisation of man power.
- WiFi functionality enables remote monitoring and data logging.

Applications

- Boat Hull infusion.
- Boat Deck Infusion.
- Civil Structures (bridges, platforms)

CIJECT 5

CIJECT® 5 has been designed for large scale direct infusion.

Utilising high precision gear pumps together with PID feedback flow control the CIJECT® 5 is capable of flow rates from 0.1Kg/min up to 30Kg/min whilst maintaining accurate material ratio.

Key Features

- PID controlled gear pumps to ensure high accuracy ratio across the entire flow range.
- Unique IMPS (In Mould Pressure Sensor) system allows unparalleled levels of control during the infusion.
- Integrated material conditioning tanks provide a system that manages the entire direct infusion process., including material degassing.

Applications

- Wind blade infusion.
- Large Spar infusion.
- Complex RTM projects.
- Epoxy/Carbon boat hulls.
- Large civil structures (bridges, decks).

CIJECT 6

CIJECT® 6 is an advanced piston style injection machine designed for resin transfer moulding of single component or premixed resin systems.

Driven by a high accuracy zero backlash worm drive, the piston can be controlled by pressure or flow to achieve specific process parameters.

Key Features

- Piston speed can be controlled by pressure (in 0.1 bar increments) or flow (in 1cc increments) providing an incredibly high level of control.
- 5 Litre piston volume suitable for R & D and prototype applications.
- User friendly MMI to enable easy operation and clear presentation of process parameters.
- Up to 20 bar injection pressure.

Applications

- R & D aerospace projects.
- Material testing applications.
- Prototype panels.

CIJECT 7

CIJECT 7® is a single component gear pump driven injection machine, designed specifically for use in the manufacturing of high-quality aerospace components.

With a range of programmable functions and control options the CIJECT® 7 can be tailored for use with RTM or resin infusion technologies.

Key Features

- Extensive control & monitoring options to ensure all process parameters (temp, viscosity, degas, flow, pressure) are achieved and data logged.
- Integrated material conditioning tank to ensure resins have been prepared to optimum parameters.
- Connectivity with upstream (material loading stations) & downstream (intelligent tooling) production stations to provide single point of control.

Applications

- RTM of complex geometries.
- High pressure RTM.
- RTM with single part high performance resin systems.
- Resin infusion prototype projects.

CIJECT 8

CIJECT® 8 is a high-performance three component resin mixing and injection machine, designed for applications requiring levels of control and verification.

With multi-stage programmable recipes, multi-component flow meters and In Mould Pressure Sensors (IMPS), the CIJECT® 8 will manage the injection process to ensure that the same injection parameters are repeated time after time.

Key Features

- Advanced powerful PLC that enables unrivalled levels of control.
- WIFI functionality enables remote operation and data logging – increasing the efficiency of operatives.
- RFID scanner to enable auto ID of injection parameters – minimises the reliance on operator input.

Applications

- RTM of complex geometries.
- Infusion up to 1200Kg.
- Programmable multistage infusion process.

The CIJECT® 8 machine was built to mix & infuse Arkema's recyclable thermoplastic Elium®.

CIJECT® SILICONE MACHINES

CIJECT SC1

CIJECT® SC1 is a portable machine, designed to dispense / spray silicones at a 1:1 mix ratio. The machine includes 2 x 2.5 litre material tanks and double acting positive displacement pumps.

Key Features

- Designed for use with 1:1 silicones.
- Includes 2 x 2.5 litre material tanks.
- Bench top for ease of movement.

Applications

- Smaller working areas.
- Small scale projects.
- Artistic / Casting.
- Television / Film set work.

CIJECT SC2

CIJECT® SC2 is simple to use, designed to dispense or spray silicones at a 1:1 mix ratio. The machine includes 2 x 25 litre material tanks, and double acting positive displacement pumps.

Key Features

- Designed for use with 1:1 silicones.
- Includes 2 x 25 litre material tanks.
- 4m hoses to spray gun for ease of use.

Applications

- Casting / artistic applications.
- Television / film set work.
- Medical applications.
- Simple silicone bagging.

CIJECT SC3

CIJECT® SC3 is a simple to use machine designed to dispense and spray silicones with a mix ratio of 10:1. The machine includes 2 x 25 litre material tanks and double acting positive displacement pumps for a robust and effortless operation.

Key Features

- Designed for use with 10:1 silicones.
- Includes 2 x 25 litre material tanks.
- 4m hoses to spray gun for ease of use.

Applications

- Silcone casting.

CIJECT SC4

CIJECT® SC4 is a robust and simple to use three componenet machine, designed to spray and dispense silicone with 1:1 mix ratio. The thixotropic additive can be used on demand through the third pump. The castor mounting and 4m hoses provide easy operation during spray.

Key Features

- Design for use with 1:1 silicones.
- Includes 2 x 25 litre material tanks.
- Additional third pump to use Thixotropic additive, to be used on demand.

Applications

- Silicone bagging for infusion.
- Silicone bagging for debulking.

CIVAC VACUUM MACHINES

CIVAC 2

CIVAC 2 is an oil filled system suited to small / medium sized Direct InfusionTM applications, as well as small scale tank degassing of up to 50L.

Available frame mounted, or integrated with a reservoir.

Key Features

- Oil Filled Vacuum Pump System.
- High levels of consistent performance with optimised noise levels.
- Reduced maintenance requirements.
- Max vacuum level 200 mbar, up to 40m³/hr.

Applications

- Small to Mid Scale Infusion.
- Small material tank degassing.

CIVAC 3

CIVAC 3 is a simple, robust and efficient dry-running vacuum system, ideally suited for medium to large RTM / VRTM, and Direct InfusionTM type applications.

Available frame mounted, or integrated with a reservoir, offering ultimate vacuum levels of up to ≤0.1 mbar .

Key Features

- Dry Screw type vacuum system.
- Robust and oil free, capable of high pumping speeds, even at low pressures.
- Energy efficient design with an air-cooled configuration.
- Max vacuum level 100-150 mbar, up to 40m³/hr.

Applications

- Medium to large infusions.
- RTM and VRTM applications.
- Tank degassing.

CIVAC 4

CIVAC 4 is a mobile vacuum station with a single stage, air cooled, oil lubricated vacuum pump, and a 30 litre resin trap.

Key Features

- Castor mounted frame for ease of movement in the workshop.
- Includes 30 litre steel resin trap.
- The oil filled on-board vacuum system is capable of high levels of consistent performance.
- Max vacuum level 200 mbar, up to 40m³/hr.

Applications

- Small to Mid scale infusion.

CUSTOMISED SYSTEMS

Beyond standard equipment, we design and manufacture customised systems tailored to specific client needs:

Advanced Equipment Capabilities

- Integrated resin mixing & conditioning equipment for heating, degassing, and injection of single or dual-component resin systems.
- Capable of handling materials from conventional Polyester & Vinylester to advanced Epoxy and BMI resin systems.
- Designed to process resin up to 350°C with viscosities up to 4000 cP.

High-Performance Specifications

- Injection pressure up to 30 bar.
- Flow rate up to 30 kg/min.

Comprehensive Material Handling & Automation

- Modules suitable for resin in both liquid and liquid-solid forms.
- Automated manifold systems to control multi-inlet infusions or mould tools.
- Fully integrated with presses and other downstream equipment for optimised production processes.

EXAMPLE CUSTOMISED SYSTEMS DEVELOPED BY CI

CIJECT 2 WITH INTEGRATED TANKS

Applications: Specifically designed for the aerospace industry.

Flow Rate: Up to 8 Kg/min. **System Type:** Epoxy 1:1 Resin System.

Features: Comprehensive heating, stirring, and degassing capabilities.
Continuous material monitoring for optimum performance.

AUTOMATED INFUSION SYSTEM FOR WIND BLADE MANUFACTURING

Applications: Customised for worldwide deployment in wind blade factories, enhancing throughput and quality.

Technology: Utilises full Direct Infusion technology for superior efficiency.

Benefits:
Up to 30 kg/min flow rate.
Simple to use, intelligent equipment.
Material heating and degassing in storage tanks.
Variable tank sizes, e.g., 800 kg or 1950 kg capacity.
Automatic process control based on pressure feedback.
Equipment automatically detects when the part is full.
Virtually zero waste.
Excellent cost-benefit ratio.

CUSTOMISED SYSTEMS

HIGH-PRESSURE RTM PRODUCTION CELL

Applications:	Specially engineered for aerospace manufacturing, ensuring high-quality, efficient production.
Press Specifications:	200-tonne automated hydraulic press. Features tool heating and a double sliding table for enhanced processing.
Tooling:	Bespoke steel tooling tailored to specific part geometries. Ensures precise temperature and pressure maintenance for optimal production rates.
Material Conditioning:	Expertly manages heating and degassing of resin and hardener to ensure premium part quality. Delivers and controls mix ratio/multi-stage injection process with comprehensive data logging.
Performance:	Injection pressure up to 30 bar. Flow rate up to 30 kg/min.
Automation:	Conditioning of resin to optimum process parameters. Management of multi-stage infusion process. Fully integrates with press and other downstream equipment.

R&D SERVICES

Research and development (R&D) lies at the heart of our operations at Composite Integration, underpinning our commitment to technological advancement.

Our expert R&D team works hand-in-hand with global clients across aerospace, marine, wind energy, construction and other sectors to explore and redefine the limits of what's possible.

We provide bespoke services designed to tackle the unique challenges our clients face, enhancing processes and equipment for the production of advanced composite materials. Utilising cutting-edge facilities and comprehensive material science expertise, we drive innovation from initial concept to full-scale production.

Our proactive and collaborative approach not only meets but often surpasses the demanding requirements of industries in need of high-performance solutions. As a result, Composite Integration is recognised as a pioneering force in advancing composite technology.

ADVANCED COMPOSITE TOOLING SOLUTIONS

We are dedicated to providing top-tier composite tooling solutions, crafted in our specialised workshops by our team of highly experienced Engineers. Our commitment to excellence is demonstrated through our detailed and skilled craftsmanship in every project we undertake.

Unparalleled Experience

With extensive experience in the industry, we excel in specifying and building high-quality composite tooling for closed-mould processes.

Our expertise allows us to handle complex challenges and deliver precise tooling solutions tailored to the unique needs of our clients.

State-of-the-Art Facilities

Our fully equipped workshop is the cornerstone of our tooling capabilities. Designed to foster innovation and precision, our controlled environment ensures that every piece of tooling is produced to the highest standards.

We utilise the latest technologies and methodologies to create durable, efficient, and high-performance tools.

Diverse Applications

We cater to a broad range of applications, ensuring versatility and adaptability in our tooling solutions.

Whether you are involved in automotive, aerospace, marine, or any other industry requiring superior composite tooling, we have the capacity and expertise to support your projects.

Commitment to Quality

Quality is not just a goal for us—it's a promise. From the initial design, to the final output, our processes are designed to meet rigorous quality standards.

We believe in building not just tools but partnerships with our clients, providing ongoing support and advice to ensure optimal outcomes.

COMPOSITE INTEGRATION

INDUSTRIES

AEROSPACE: ACHIEVE HIGH QUALITY AT RATE

In aerospace manufacturing, the balance between maintaining exceptional quality and achieving high production rates is paramount. Composite Integration stands at the forefront of resolving this critical challenge.

Pioneered by Composite Integration, our Direct Infusion processes coupled with the innovative CIJECT® equipment, enables your production lines to not only meet, but exceed the stringent demands of aerospace manufacturing.

We are proud to work with major global aerospace manufacturers, enabling them to produce the most complex parts with ease.

Pre-Preg Versus Direct Infusion

While pre-preg has long been the method of choice in aerospace manufacturing, Direct Infusion presents a superior option, offering greater cost efficiency, scalability, and environmental benefits.

Limitations of Pre-Preg materials

High Costs

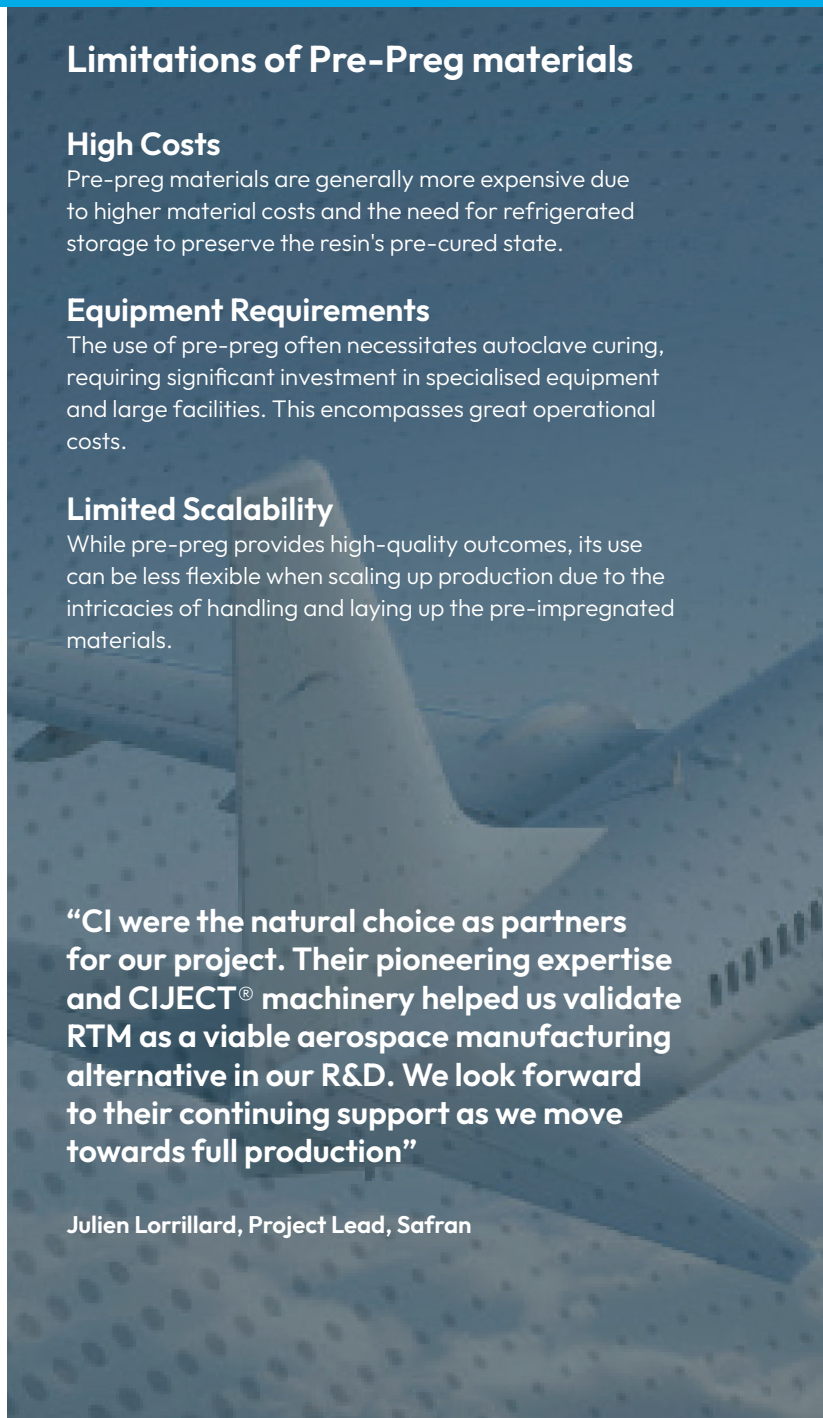
Pre-preg materials are generally more expensive due to higher material costs and the need for refrigerated storage to preserve the resin's pre-cured state.

Equipment Requirements

The use of pre-preg often necessitates autoclave curing, requiring significant investment in specialised equipment and large facilities. This encompasses great operational costs.

Limited Scalability

While pre-preg provides high-quality outcomes, its use can be less flexible when scaling up production due to the intricacies of handling and laying up the pre-impregnated materials.



“CI were the natural choice as partners for our project. Their pioneering expertise and CIJECT® machinery helped us validate RTM as a viable aerospace manufacturing alternative in our R&D. We look forward to their continuing support as we move towards full production”

Julien Lorrillard, Project Lead, Safran

AEROSPACE: ACHIEVE HIGH QUALITY AT RATE

Why Choose Direct Infusion for Aerospace Manufacture?

Consistent High Quality

Precision Engineering
Our Direct Infusion technology guarantees uniform resin distribution, crucial for achieving the highest structural integrity with minimal voids. Experience components that meet rigorous aerospace standards, every time.

Quality at Rate
Accelerate production without compromising on quality. Our CIJECT® machinery optimises the infusion process, enabling faster cycle times and increased throughput to keep pace with industry demands.

Lighter, Stronger Components
Direct Infusion enables the production of lighter, stronger components by allowing precise control over resin content and increasing the fibre volume fraction. This advanced method enhances the strength-to-weight ratio of parts, making it ideal for applications where performance and weight reduction are critical.

Cost Efficiency

Reduced Material Waste
Direct Infusion uses raw materials more efficiently, resulting in significant cost savings. Reduce waste and lower the environmental footprint of your manufacturing process.

Lower Operational Costs
Our CIJECT® equipment is easy to use, reliable and low maintenance. You can spend less time on upkeep, and more time on production.

Comprehensive Data

The equipment records and delivers detailed in-process data to support engineering conformance. Informs and supports your decision-making process.

Scalability & Flexibility

Adaptable Systems
Whether you're producing large fuselage sections or intricate smaller components, our CIJECT® machinery is adaptable to a range of sizes and complexities.

Customisable Processes
Tailor every aspect of the infusion process to the specific needs of your aerospace components. Our team of experts will work with you from the onset to determine your goals, and to develop and implement a future proof solution.

WIND: STRONGER, LIGHTER & SUSTAINABLE COMPOSITES

In the competitive world of wind turbine blade manufacturing, the pressure to produce blades that are not only high in quality but also meet rigorous standards of performance, durability, and efficiency is immense. Manufacturers have accepted that improving quality in production, reduces costs in the field. We have responded to these challenges with our trademarked Direct Infusion CIJECT® machinery.

Our advanced technologies significantly enhance blade quality, reducing re-work costs, minimising material waste and lower production costs, helping address both the environmental impact and the economic pressures of blade manufacturing.

Direct Infusion for Wind Turbine Blade Manufacturing

Dedicated to our mantra 'there's always a better way', we have spent over two decades perfecting our Direct Infusion technology. This method represents a leap forward in wind turbine blade manufacture, where precision engineering ensures uniform resin distribution—essential for achieving the highest structural integrity, with minimal voids.

Our process ensures that blades consistently meet rigorous standards, maintaining quality even as production rates increase. Our CIJECT® equipment further enhances the production process, optimising infusion for faster cycle times and higher throughput, without compromising on quality. This makes Direct Infusion an ideal choice for manufacturers looking to enhance efficiency and output.

Key Benefits of Direct Infusion for Blade Manufacture

Consistent High Quality

Direct Infusion with CIJECT® ensures every wind turbine blade meets strict standards through precise control over resin preparation, mixing, injection, distribution, and curing. This guarantees uniform quality and performance.

Cost Efficiency

These methods reduce material waste with precise infusion techniques, using only the necessary amount of resin. This lowers material costs and environmental impact. Additionally, reduced rework and scrap rates contribute to overall cost savings, making the manufacturing process more economical and sustainable.

Quality at Speed

By integrating CIJECT® Advanced Automation solutions with Direct Infusion it is possible to achieve greater production output enabling manufacturers to meet high demand efficiently and effectively.

Scalability, Flexibility & Lightweight

These technologies are adaptable and customisable, handling various blade sizes and complexities. Easily scale production up or down, and accommodate new designs quickly. Direct Infusion excels in producing lightweight and complex structures, ensuring robust, durable, and optimised wind turbine blades.

'We're proud to offer repeatable process parameters at the touch of a button. Intuitive machine design, for complex part manufacture, at scale'

Richard Bland, Technical Director, Composite Integration

WIND: STRONGER, LIGHTER & SUSTAINABLE COMPOSITES

Why Choose CIJECT Machines for Wind Manufacture?

Advanced Automation & Precision Control

CIJECT® machines incorporate in-mould pressure sensors (IMPS) for real-time monitoring of infusion pressure. These sensors control the flow rate and regulate volumetric compression, enabling completely automated and precise control over the entire operation. This level of automation ensures complete control over the composites process, producing components with consistent quality and structural integrity, crucial for demanding wind turbine environments.

Sustainable & Efficient Manufacture

By automating the resin infusion process and eliminating the need for bulk resin mixing, CIJECT® technology significantly reduces material waste and enhances the overall sustainability of the manufacturing process. Our machines can also use sustainable alternatives to traditional epoxy resins, such as reactive thermoplastics, offering environmental benefits, while maintaining high quality and strength.

Lightweight Yet Durable Components

Achieve superior strength-to-weight ratios, essential for high-performing wind turbines, thanks to precise control over material composition.

Reliable Operation

Our CIJECT® machines are engineered to maintain consistent material handling, crucial for sustaining uninterrupted production quality.

Comprehensive Data

The equipment records and delivers detailed in-process data to support engineering conformance. Informs and supports your decision-making process.

User Friendly Software

Intuitive interfaces and easy-to-use software eliminate complexities in machinery operation, making it accessible to all levels of technical expertise.

Adaptable & Scalable Solutions

Our CIJECT® machines can be customised to assorted sizes and complexities, ensuring seamless integration into your existing production lines.

MARINE: PUSH THE BOUNDARIES IN BOAT MANUFACTURE

In the dynamic world of boat manufacturing, evolving your production process is key to staying competitive.

At Composite Integration, we specialise in transitioning manufacturers from traditional hand lay-up and manual infusion, to our cutting-edge Direct Infusion technology.

This shift not only enhances efficiency and sustainability but also propels your operations towards greater profitability and quality.

Hand-Laying VS Direct Infusion

In traditional hand-laid composite manufacturing, a meter-mixing machine can be used to dispense mixed resin 'on demand' into a bucket. This method is widely used for custom or low-volume production however, it presents several challenges and limitations:

- It's Labour Intensive.
- Quality can vary significantly.
- It's not suited to high production volumes.
- Workers are exposed to chemical vapours.
- It's limited to using only certain materials.
- It presents higher levels of waste.

In response to the limitations of hand-laying, we pioneered the Direct Infusion Process in the early 2000s.

As the name suggests, Direct Infusion uses positive pressure to inject resin directly into the infusion process. This process is much more reliable, considerably safer, and enables you to consistently reproduce quality parts.

Direct Infusion is made posssible with our extensive range of CIJECT® machines. They enable you to have complete control over the entire composites process.

"Composite Integration worked with us to help our team move away from conventional infusion to Direct Infusion, using CIJECT® equipment. Their level of support at every stage, and the resulting efficiency improvements should be commended."

Adam Brangan, Director of Naval Architecture & Materials Engineering, Sunseeker International

MARINE: PUSH THE BOUNDARIES IN BOAT MANUFACTURE

Why Choose Direct Infusion for Boat Manufacturing?

Transitioning to Direct Infusion is more than an upgrade—it's a strategic enhancement of your manufacturing capabilities. Here's why this change is essential:

Enhanced Quality

Direct Infusion provides consistent resin-to-fibre ratio, significantly reducing the risk of voids, ensuring uniform composite structure. This leads to stronger, more reliable boats that meet high-quality standards.

Enhanced Efficiency

Streamline your production process with Direct Infusion. This method requires less manual labour, allowing you to increase output and meet customer demand more effectively.

Cost Savings

With Direct Infusion you can reduce consumables and waste, using materials more efficiently. Direct Infusion minimises excess resin use, helping you to cut down on costs associated with material wastage.

Increased Safety

By limiting exposure to harmful chemicals, direct infusion creates a safer work environment. This not only protects your team but also reduces health-related absences and potential liabilities.

Enhanced Aesthetics

Products finished with Direct Infusion often require less post-processing. This not only saves time but also enhances the final appearance of your boats, making them more appealing to consumers.

More Sustainable

Direct infusion is more environmentally friendly, significantly reducing the emission of volatile organic compounds (VOCs). Align with regulations and demonstrate your commitment to sustainability.

Comprehensive Data

The equipment records and delivers detailed in-process data to support engineering conformance. Informs and supports your decision-making process.

AUTOMOTIVE: QUALITY COMPOSITE FINISHES AT PACE

Though we must keep the specifics under wraps due to NDA's with world leading super-car and high-performance automotive brands, we're proud to be at the forefront of significant advancements in the automotive industry.

Whatever your challenge, from camper-van roofs, to intricate supercar components, our world-class expertise and precision CIJECT® machinery make us the partner of choice.

A Better Way

Many automotive manufacturers still use pre-preg techniques in their quest to create lightweight, cost-effective, and sustainable composite parts. However, a superior alternative exists.

For over two decades, we have refined our RTM technology, a major improvement in composite part production. RTM ensures even resin distribution, crucial for optimal performance and structural integrity with minimal voids. It also delivers a quality finish, with parts requiring minimal post-processing.

Our CIJECT® equipment supports faster cycle times and higher throughput without compromising quality, making RTM the preferred method for manufacturers seeking to enhance performance, efficiency, and output.

Lightweight Automotive Solutions

Developing lighter components that surpass traditional materials like steel and injection-moulded processes.

Cost Reduction

Redefining cost structures for more economical manufacturing.

Quality Finishes at Pace

Quick turnaround, quality parts that require little or no trimming, sanding or other finishing techniques.

Enhanced Recyclability

Promoting environmentally friendly practices over traditional steel and injection moulded manufacturing.

CONSTRUCTION: ALL WEATHER COMPOSITES

Equipped with advanced CIJECT® machinery and expertise in composite manufacturing, we provide robust, durable solutions for the construction industry. Our technology optimises performance and cost-efficiency, producing parts that withstand extreme conditions.

Our solutions reduce costs and enhance operational efficiency, allowing clients to achieve environmental goals without sacrificing quality. We are uniquely positioned to address the specific challenges of the construction sector.

A Better Way

We've refined our RTM & VRTM technology for over 20 years, significantly advancing construction manufacturing. Our process ensures uniform resin distribution, essential for optimal performance and structural integrity with fewer voids, and is more sustainable, using less waste and greener materials.

Additionally, our CIJECT® equipment ensures that parts meet strict industry standards consistently, allowing for faster cycle times and higher throughput, without sacrificing quality.

Advanced Automation & Precision

CIJECT® machines are equipped with in-mould pressure sensors (IMPS) that monitor infusion pressure in real-time, regulating flow rate & volumetric compression. This automation provides precise control over operations, ensuring consistent quality & structural integrity of components.

Reliable Operation

CIJECT® automates the resin infusion process, significantly reducing material waste and enhancing manufacturing sustainability. Our machines can use sustainable alternatives, such as reactive thermoplastics, providing environmental benefits while maintaining high quality and strength.

Lightweight/Durable

Achieve superior strength-to-weight ratios with precise control over material composition.

Adaptable

Our CIJECT® machines can be customised to various sizes & complexities, ensuring seamless integration into existing production lines.

User-Friendly

Intuitive interfaces and easy-to-use software simplify machinery operation, making it accessible to all levels of technical expertise.

Comprehensive Data

The equipment records and delivers detailed in-process data to support engineering conformance. Informs and supports your decision-making process.

DEFENCE: COMPOSITES FOR EXTREME ENVIRONMENTS

Our extensive expertise in military composites has led us to develop groundbreaking products ranging from run-flat tires, ballistic armour, blast proof structures and helmets.

Engineered to endure extreme temperatures and severe conditions, our solutions are crafted for maximum impact resistance using materials that are not only lightweight but also corrosion-resistant.

While confidentiality agreements prevent us from disclosing specific manufacturing processes, our proven track record positions us at the forefront of innovation in the military sector.

A Better Way

Many military manufacturers are still using hand-lay or pre-preg techniques to produce composite parts that are lightweight, corrosion-resistant, and able to withstand high temperatures and harsh conditions. But there's a better way.

We've spent over two decades perfecting our RTM & Direct Infusion technology, a significant advancement in military manufacturing. This supports dimensional accuracy, low void content, and excellent structural integrity.

Advanced Automation & Precision

CIJECT® machines are equipped with in-mould pressure sensors (IMPS) that monitor infusion pressure in real-time, regulating flow rate & volumetric compression. This automation provides precise control over operations, ensuring consistent quality & structural integrity of components.

Reliable Operation

CIJECT® automates the resin infusion process, significantly reducing material waste and enhancing manufacturing sustainability. Our machines can use sustainable alternatives to traditional epoxy resins, such as reacted thermoplastics, providing environmental benefits while maintaining high quality and strength.

Lightweight/Durable

Achieve superior strength-to-weight ratios with precise control over material composition.

Adaptable

Our CIJECT® machines can be customised to various sizes & complexities, ensuring seamless integration into existing production lines.

User-Friendly

Intuitive interfaces and easy-to-use software simplify machinery operation, making it accessible to all levels of technical expertise.

Comprehensive Data

The equipment records and delivers detailed in-process data to support engineering conformance. Informs and supports your decision-making process.

EDUCATION: THE FUTURE OF ENGINEERING WITH COMPOSITES

Advanced composites manufacturing is not only an exciting and dynamic field; it is also critical in moulding our next generation of engineers.

The boundaries of what's possible are constantly being pushed, as are developments in materials, processes and production technology. It's important therefore, that the very latest equipment and industry knowledge are available to academic institutions and their students.

Our CI team are recognised worldwide as experts in the field, and our CIJECT® machines are renowned for their quality, reliability and ease of use, making us the perfect partner for student and research installations.

Sharing our Knowledge & Expertise

We are committed to sharing our knowledge and expertise with the industry and its community.

Since pioneering the Direct Infusion process decades ago, we have been at the forefront of pushing technological boundaries. Our collaboration with leading institutions and industries ensures continual progress in composite manufacturing.

Training

We constantly publish educational content, helping the composites community in their quest for the best, to achieve optimal results from their processes and our equipment.

Research & Development

Our in-house R&D facilities, combined with partnerships with organisations like the National Composites Centre and Innovate UK, focus on applied industrial research that leads the sector.

Knowledge Sharing

We publish whitepapers and research papers, sharing the results of our R&D projects with the community. Sharing our knowledge is integral to our culture.

YOUR NOTES

COMPOSITE INTEGRATION

Pioneering COMPOSITE Manufacturing SOLUTIONS

SCAN HERE TO CONTACT THE CI TEAM

EXPLORE OUR WEBSITE FOR MORE INFORMATION