| | | |
|---|---|---|
| *Protocol for the procurement of circular products by Slovenian manufacturing companies* | Type:<br>Coordination ☐<br>Administrative ☐<br>Technical ☒<br>Communication ☒<br>Steering Committee ☐<br>Other: ☐ | Ref. WP3_D3.3.1<br>Date: 22/08/2025 |
| **Document details** | | |
| Project | RECREATE: Improving the circular economy model for collection and processing of fiber-reinforced composites, containing waste | |
| Work package | 3 | |
| Deliverable | D.3.3.1. | |
| Dissemination level | Public | |
| Dissemination target | Enterprises | |
| Authors | Matteo Feruglio; Jaka Sturm; Marica Mioni | |
| Due delivery | Period 1 | |
| Version | Final | |



| | | |
|---|---|---|
| PREPARED BY | SDGZ-URES | |
| SC document ☐ | Confidential document ☐ | Public document ☒ |

Il progetto RECREATE è co-finanziato dall'Unione europea nell'ambito del Programma Interreg VI-A Italia-Slovenia.
Projekt RECREATE sofinancira Evropska unija v okviru Programa Interreg VI-A Italija-Slovenija.

# Table of contents





Il progetto RECREATE è co-finanziato dall'Unione europea nell'ambito del Programma Interreg VI-A Italia-Slovenia.
Projekt RECREATE sofinancira Evropska unija v okviru Programa Interreg VI-A Italija-Slovenija.

Ref: WP3_D.3.3.1

www.ita-slo.eu/RECREATE

Interreg Italia-Slovenija
RECREATE

Cofinanziato dall'Unione europea
Sofinancira Evropska unija

# About the project RECREATE - "Improving the circular economy model for collection and processing of fiber-reinforced composites, containing waste"

The RECREATE project takes up the challenge of the Programme area relating to the transition to a circular economy by proposing a circular economy model for fiber-reinforced composite materials (FRC), capable of improving the environmental sustainability of the Program area by reducing the quantity of the waste produced and improving the management of FRC waste in the Programme area.

RECREATE project aims to capitalize some of the strategic results of the Interreg Italy-Slovenia 14-20 Retracking project by proposing a recycling methodology capable of introducing new products made from FRC (fiber-reinforced composites) recycled material into the economic system. The circular economy model will be tested by two entities belonging to the value chain: a public body and a company that uses FRC. The municipal FRC waste will be included for the first time, for which the greatest management difficulties currently exist, into the circular economy model. An Italian Municipality and a Slovenian private company will acquire recycled CFR products, demonstrating the possibility of applying the circular model to public and private bodies and defining the path for its extension to the Italy-Slovenia Programme area. The partnership is composed by 1 Lead Partner and 5 Project Partners from the eligible cross border area of Italy-Slovenia Programme. They represent public and private entities that cooperate through their competences and expertise (practical application of circular economy models in different sectors, technological transfer, public administration, manufacturing sector of big companies and SMEs, ESG sustainability) for the accomplishment of the project objectives.



The project carries out three main actions: 1) Project Coordination; 2) FRC waste collection that requires the involvement of the citizens of the municipality and the operative staff of the private company. For this action, the partners will elaborate the Guidelines for the correct identification, treatment, management and preparation of FRC waste defined in the Program area which can be used by additional waste management companies. The rules for cross-border transportation/exportation of FRC waste (from Slovenian company to Italian company responsible for the recycling process) will be identified. The operators of waste utilities will be trained. The companies of the manufacturing and small businesses sectors will benefit of capacity building activities about economic circularity, green transition and zero waste policies. These ones will be involved at one-day study visit in Italy, in order to transfer best practices on the re-usage of FRC material within the industrial sector and its interoperability with the urban sector. The citizens will be sensitized through a public campaign on recycling, re-using and collecting FRC waste. This campaign will tackle many relevant topics dealing with the right waste collection at municipal level and the practical usability of the circular economy model. 3) FRC production requires that the waste will be recycled and the resulting products will be analyzed, produced by following specific production standards, certified and integrated into the municipality's public spaces and into the company's production process. Protocols for the acquisition of CFR products will be developed by public bodies and companies in the Programme area, pertinent with Italian and Slovenian legislation. The main actions will be accompanied by communication actions, dissemination events, launching and participatory events with citizens and public and private bodies.

Il progetto RECREATE è co-finanziato dall'Unione europea nell'ambito del Programma Interreg VI-A Italia-Slovenia.
Projekt RECREATE sofinancira Evropska unija v okviru Programa Interreg VI-A Italija-Slovenija.

# 1. Circular economy policy in Slovenia

The topic of circular economy in Slovenia has been gaining attention in the last decade, as it has been seeking to align itself to the roadmaps and action plans set by the European Commission, which culminated in the new Circular Economy Action Plan For a cleaner and more competitive Europe, published in March 2020. The European Commission's action plan introduces measures to ensure that new manufactured products are designed to achieve a higher durability, reparability, and recyclability, as well as setting goals for the reduction of waste, particularly of single-use plastics. The Action Plan also recognizes the need improve to existing legislation and to reduce regulatory gaps that hinder the achievement of circular economy objectives. Finally, it recognizes that enterprises need to be supported in the transition towards circular economy models, also with incentives and funding.

The only comparable document of the Government of Slovenia was published in 2018, namely the **Roadmap towards the circular economy in Slovenia**, which defined that circular economy is a strategic development priority of the country. The Roadmap is based on a so-called "Circular Triangle" which should combine Circular Economy (business models), Circular Change (government policies) and Circular Culture (citizens).



The document realizes that Slovenia's path towards circular economy faces systemic challenges, as **Slovenia imports more than 70% of raw materials consumed domestically**, and understands the need for collaborations among stakeholders. Transition is seen as difficult without the involvement of corporate leaderships that adhere to a vision of new value chains, which brings new opportunities, but also new risks.

For the economic sector, the Roadmap provides generic guidelines to which companies should adhere, such as:

- design products in a modular way, facilitating repair and maintenance, as well as recycling;

- transition from products to services, with the manufacturer retaining ownership of the (more expensive, but more durable) good, thus increasing efficiency and reducing material costs;

- exchange between stakeholders of materials once declared to be waste;

Il progetto RECREATE è co-finanziato dall'Unione europea nell'ambito del Programma Interreg VI-A Italia-Slovenia.
Projekt RECREATE sofinancira Evropska unija v okviru Programa Interreg VI-A Italija-Slovenija.

- tightening energy loops.

Furthermore, the roadmap identifies 4 priority sectors:

- food systems: sustainable agriculture, reducing food waste, and promoting local food production;
- forest-based value chains: enhancing sustainable forestry practices and increasing the use of wood in construction;
- manufacturing industry: encouraging the adoption of circular business models and improving resource efficiency;
- mobility: promoting sustainable transportation solutions and reducing the environmental impact of mobility.

Also, other governmental documents, such as the "Development Strategy of Slovenia 2023", adopted in the year 2017, mentions circular economy as a driver towards better quality of life thanks to reduction of pollution and better use of resources, but also admits that **Slovenian companies are lagging behind the EU average in implementing measures to move towards a circular economy**. Again, the dependency on imported raw materials is listed as the primary obstacle towards the adoption of circular business models. One of the suggested solutions of the problem is educating and bringing together different stakeholders to move towards a circular economy.



The Slovenian Environmental Protection act ZVO- 2 (*sl. Zakon o varstvu okolja – ZVO-2)*, in force since April 2022, indicates circular economy as a major part of national environmental policy and provides the legal framework to promote sustainable use of resources, waste prevention and environmental protection. ZVO – 2 implements European union directives such as Waste hierarchy: prioritize waste prevention, followed by reuse, recycling, and recovery over disposal. An important aspect directly related to circular economy model is the introduction of **Extended Producer Responsibility or EPR** (*sl. Proizvajalčeva razširjena odgovornost*), which requires producers to take responsibility for the entire lifecycle of their products, including post-consumer waste management. Other key provisions of the law are eco-friendly product design, use of durable and repairable, recyclable materials, green public procurement and the development of secondary raw materials. Also relevant to circular business models is the establishment of clear rules on when waste cease to be waste (article 28), but leaves to the Government the definition

of criteria such as permitted processes and techniques, quality requirements, demonstration of compliance with end of waste status, and permitted uses of processed materials or goods (article 29). Finally, the law encourages reduction of consumption and the principles of circular economy, without going into details (article 6).

ZVO-2 thus lays a legal foundation for Slovenia's transition to a circular economy, promoting sustainable consumption and production in line with EU environmental objectives. However, it includes only **general provisions** and **principles** that **support** the development and implementation of circular business practices. It does mention circular economy as a principle which the State and municipalities should strive for, but there is **no definition of circular business model** and **no specific criteria** for labeling or certifying a business product as "circular" – such measures should be taken by the Government with specific acts.

Slovenian authorities recognize the need for manufacturing enterprises to shift towards circular economy models. In fact, in May 2025, the Slovenian Centre for Circular Economy (*sl. Slovenski center za krožno gospodarstvo*) was launched. It is an initiative co-funded by the European union and it consists of 8 institutions providing guidance to enterprises, public authorities and citizens on transitioning towards green economy and circular economy. Guidance will be provided at ten locations throughout Slovenia; at the time of writing the operativity of the project is still being established.



In short, as of 2025 there is no specific provisions on the characteristics that a circular business model should have or how circular products ought to be exchanged/ sold, nor which characteristics these products should have. The outline and implementation of these models are sole responsibilities of the companies involved in the circle, needless to say that all environmental legislation has to be fulfilled by all parties.

Il progetto RECREATE è co-finanziato dall'Unione europea nell'ambito del Programma Interreg VI-A Italia-Slovenia.
Projekt RECREATE sofinancira Evropska unija v okviru Programa Interreg VI-A Italija-Slovenija.

# 2. Purpose and scope of the Protocol

The purpose of this protocol is to support the establishment of cross-border circular business models for recycled fiber-reinforced composites (FRC) between Italy and Slovenia, which is a manufacturing sector traditionally challenged by the complexity and heterogeneity of materials. The protocol is based on the experiences matured during the RECREATE project, during which the feasibility of such model was tested. This protocol intends to provide suggestions to Slovenian manufacturers by providing examples of a closed-loop processing of fiber reinforced composite waste (e.g., thermoset or thermoplastic composites reinforced with glass, carbon, or natural fibers) with the goal of transforming end-of-life or production scrap materials into new, value-added circular products.

In particular, identifying a protocol will boost the capabilities for the acquisition of circular products in FRC by the Slovenian manufacturing industry. The protocols will include **acquisition contract templates** for the following use - cases of CFR product acquisition:

- purchase;
- research project;
- innovation project.

Keeping in mind that each and every end use of the circular product has specific, non-transferable requirements, the contract templates will offer the room for listing specific performance requirements for the purchase and use of CFR products by the Slovenian manufacturing industry, including the following information:



- Structural stability and durability of the raw material;
- Aesthetics of the raw material;
- Environmental criteria;
- Packaging criteria.

By supporting this kind of circular supply chain, the protocol aims to:

- reduce the environmental footprint of composite manufacturing by diverting waste from landfill or incineration;
- promote the reuse of fiber-reinforced composites through cross-border cooperation;
- provide evidence of the feasibility of establishing cross-border circular business models.

Il progetto RECREATE è co-finanziato dall'Unione europea nell'ambito del Programma Interreg VI-A Italia-Slovenia.
Projekt RECREATE sofinancira Evropska unija v okviru Programa Interreg VI-A Italija-Slovenija.

# 3. Definitions

For the sake of this protocol, we hereby provide a few explanatory definitions of the material and actors involved in a circular product closed loop.

**FIBER-REINFORCED COMPOSITES (FRC):** Materials consisting of a polymer matrix reinforced with high-strength fibers designed to combine the advantageous properties of both components. The matrix—typically a thermoset or thermoplastic resin—serves to bind the fibers together, transfer loads, and protect the fibers from environmental and mechanical damage. The fibers—such as **glass, carbon, aramid, or basalt**—provide mechanical strength, stiffness, and improved structural performance.

FRC materials are used because of their high strength-to-weight and stiffness-to-weight ratios, excellent fatigue and corrosion resistance, and a wide range of applicability.

They are widely used in **aerospace, automotive, construction, marine, wind energy, and sports equipment industries**, where lightweight and durable materials are critical.

**CIRCULAR PRODUCT:** A material or component derived or finished good that is manufactured from recovered or recycled resources, designed and produced in such a way that it supports longer life, reuse, repair, refurbishment, remanufacturing, or full recyclability at the end of its service life.



In the context of this protocol, a circular product specifically refers to a product made from fiber-reinforced composite (FRC) waste, which:

- Incorporates a significant share of secondary raw materials obtained through authorized recycling or recovery processes;
- Complies with technical performance requirements and applicable standards for its intended use;
- Reduces the need for virgin material extraction, greenhouse gas emissions, and overall environmental impact;
- Contributes to the circular economy by closing material loops and enabling further recovery at the end of its use phase.

**WASTE PRODUCER:** is typically a manufacturing entity that generates non-hazardous FRC production waste during routine operations. In the framework of the RECREATE project, the waste producer is a Slovenian manufacturing enterprise. FRC waste may include:

- **Off-cuts, trimmings, or defective parts** from production processes;
- **End-of-life components** such as molds, panels, or reinforcements;

- **Composite dust or residue** from cutting, grinding, or finishing operations.

The producer's obligations include:

- Ensuring that FRC waste is **correctly identified, separated from other waste and stored** to maintain material integrity and prevent contamination.
- Providing accurate data on **waste composition, volume, and origin**, accompanied by relevant declarations (safety data sheets, waste codes, laboratory analysis).
- Cooperating with **licensed transporters** to ensure compliant transboundary shipment under EU Waste Shipment Regulation (EC) No 1013/2006.
- Entering into a **bilateral agreement** with the Italian recycler that defines responsibilities, liabilities, and traceability.

The waste producer may or may not possess the capability to transform the waste into an End of Waste (EoW) material (i.e. a material was originally classified as waste but has undergone a recovery operation and that it is no longer considered waste under EU and national law, according to Directive 2008/98/EC).

**RECYCLER:** It is in our case an (Italian) facility operating under EU and Italian regulations that is authorized for recovery activities of non-hazardous composite waste. Their role is to convert FRC waste into high-quality secondary raw materials and/or finished circular products through mechanical or thermo-chemical processes. The key responsibilities of the recycler include:



- Operating under **valid environmental permits** (e.g., under Italy's Legislative Decree 152/2006) that allow for the treatment and transformation of imported composite waste.
- Implementing **documented procedures** for incoming material inspection, material recovery, and product quality assurance.
- Producing items such as recycled FRC panels, profiles, granulates, or molded parts that meet pre-agreed technical specifications and market standards.
- **Issuing recovery certificates**, providing Life Cycle Assessment (LCA) data where applicable, and ensuring compliance with circular economy and eco-design principles.

Il progetto RECREATE è co-finanziato dall'Unione europea nell'ambito del Programma Interreg VI-A Italia-Slovenia.
Projekt RECREATE sofinancira Evropska unija v okviru Programa Interreg VI-A Italija-Slovenija.

# 4. Process overview

This chapter outlines the material flow and lifecycle of fiber reinforced composites (FRC) in a closed-loop circular system, connecting a Slovenian Waste producer, an Italian recycler, and the same Slovenian company as a reintegrator of recycled FRC material. The described process aims to demonstrate a sustainable industrial symbiosis, where waste is transformed into valuable secondary raw materials and reintroduced into the production cycle, minimizing landfill usage, reducing virgin material dependency, and lowering the environmental footprint. By taking into account the framework of the RECREATE project, the circular loop is composed of three core phases:

1. **Generation of FRC Waste (Slovenia)**
2. **Recycling and Reprocessing (Italy)**
3. **Reintegration of Recycled FRC (Slovenia)**

Each phase assumes a constant cooperation between the Waste producer in Slovenia and the Recycler. The whole process requires logistical coordination, material traceability according to European and national legislation, and quality assurance protocols that ensure the recycled product meets the technical and environmental standards for the intended application. It is important to note that this process cannot take place unless there is a **signed contract** between the Waste producer and the Recycler (see Chapter with contract templates).



## 4.1 Generation of FRC Waste

Slovenian manufacturers, operating in sectors such as manufacture of plastic articles, automotive, marine industries, etc. generate FRC waste as part of production offcuts, defective parts, surplus materials or end-of-life products. These composites are typically composed of polymer material reinforced with glass. This kind of waste is usually non-hazardous. Although it may occur that contamination with hazardous material takes place at a production plant, for the purpose of this project **only non-hazardous FRC waste** are taken into account.

**DECOMMISSIONED BOATS**

**PARTS OF DISMANTLED WIND TURBINES**

Once generated, the waste is collected directly at the production line and transferred to a designated sorting area. Here, the material may be separated according to type of polymer matrix (e.g., polypropylene, polyester, epoxy) and fiber content, or not at all.

Non-composite contaminants such as adhesives, metal inserts, screws, packaging residues, or mixed plastics are removed to ensure a cleaner recycling stream. In many facilities, visual inspection is complemented by basic material identification tests, and larger items may be cut or shredded to manageable sizes for transport and further processing.

**POLYMERS NOT PROPERLY POLYMERIZED**

**SOLVENT RISIDUES**



**THERMOPLASTICS**

After sorting, the fiber-reinforced waste is processed to make it suitable for efficient and safe transportation to the recycling facility. Large or irregularly shaped components are cut down or shredded to reduce volume and facilitate handling. This size reduction also helps optimize loading density in transport containers, lowering logistics costs.

Afterwards, it is important to document and classify the type of waste (composition, fiberglass content, polymer type), more so if the producing plant produces different waste types during its production cycle. The waste needs to be **classified correctly with a European Waste Code.** If not done at an earlier stage, a **laboratory analysis of the waste batch** should be carried out, at least

at the first delivery. This should be done in order to certify the non-hazardous nature of the material, but also and equally important to provide the Waste recycler with the necessary information that is needed to undertake recycling operations.

When it comes to waste classification, it is important to identify the waste correctly, depending on the manufacturing process or activity that produces.

**EWC 07 02 13 "waste plastic"** is often the *default* non-hazardous code used for fiber-reinforced composites (FRCs) when they come from industrial or manufacturing sources, since it covers wastes generated from organic chemical processes, specifically "wastes from the manufacture, formulation, supply and use of plastics, synthetic rubber and man-made fibers."

Fiber-reinforced composites are essentially a **polymer matrix** (thermoset or thermoplastic) with reinforcing fibers (glass, carbon, aramid); since the resin is the main "chemical" in regulatory terms, most authorities treat FRC scrap as "waste plastic" unless there's a more specific entry. There is however **no guarantee that authorities** accept this interpretation every time, and it may even be required to undertake the "prior notification and consent procedure" for cross-border FRC waste shipments, based on the assumption that fiber-reinforce composites are a mixture of various materials (plastic, glass and resins).

Other possible EWC codes that may be used for the classification of FRC waste are the following:

- 02 01 04 waste plastics (except packaging) from agriculture, horticulture, aquaculture, forestry, hunting and fishing food preparation and processing



- 12 01 05 plastics shavings and turnings
- 15 01 02 plastic packaging (waste packaging)
- 16.01.19 plastic (wastes not otherwise specified in the list)
- 16.02.16 components removed from discarded equipment other than those mentioned in 16 02 15
- 16.03.06 organic wastes other than those mentioned in 16 03 05
- 17.02.03 Plastic (construction and demolition waste)
- 19.12.04 plastic and rubber
- 20.01.39 plastic

The prepared material is then compacted, baled, or placed into industrial bulk bags (big bags). Waste producers have to be careful to follow indications from the Waste recycler on how the waste should be sorted and packaged. The packaged FRC waste is stored in a designated covered area to protect it from weather exposure until shipment. All packaging is labeled to indicate the material type, fiber composition, and source batch, ensuring traceability and compliance with transport documentation requirements for cross-border shipment to Italy.





**PACKAGED WASTE**

**Transport**

Cross-border transport of waste from Slovenia to Italy is carried out by a **licensed freight transport company** that is authorized to handle waste materials in compliance with environmental and transport regulations. The company must hold valid authorization for non-hazardous waste transport issued by the Ministry of Environment in Slovenia (*Ministrstvo za okolje podnebje in prostor - MOPE)*, as well as the corresponding authorization recognized in Italy (*Albo gestori ambientali*), ensuring legal operation in both jurisdictions. A Community license for international road haulage operations within the EU is also required.

Detailed guidelines for the cross-border transport of waste can be found in the publicly available transport guidelines developed by the RECREATE project.

## 4.2 Recycling and reprocessing

The FRC waste arrives at the Italian recycler, a facility specialized in processing composite materials through mechanical (or other) recycling methods.

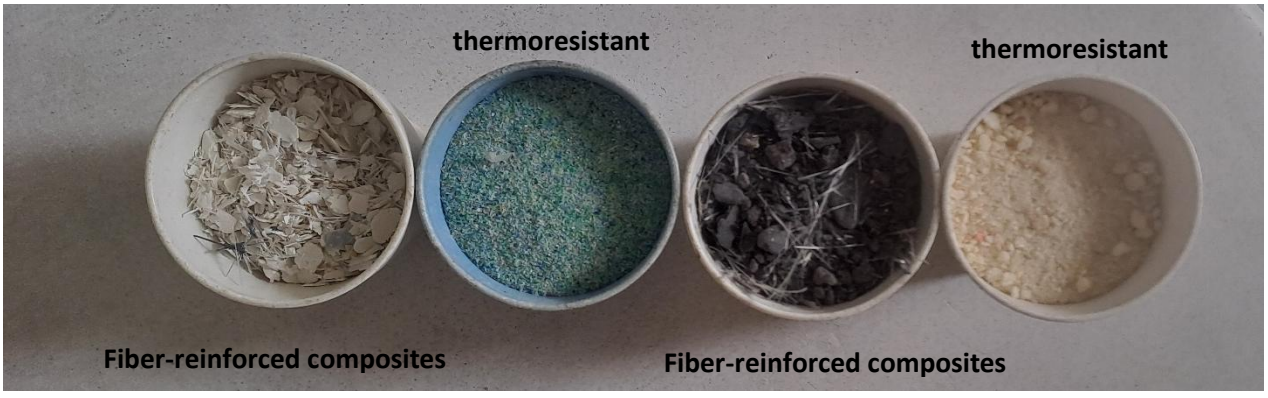
For fiber-reinforced composites containing thermoplastics, mechanical recycling routes such as shredding, grinding, and melt reprocessing may be applicable. By grinding, FRC waste is broken

down in smaller particles or granulates od desired size. For thermoset composites, the material is typically manipulated by specialized recyclers who use mechanical, thermal, or chemical processes to recover fibers and fillers.

WASTE ON CONVEYOR BELT ENTERING A RECYCLING PLANT



At the end of the process the waste is transformed into a new material, at this point it legally ceases to be considered waste. In the EU, such material is called **End of waste** and it can be used either as a new product or as a raw material again, thus reducing or eliminating the need for virgin material.




GRINDED COMPOSITE WASTE

Recovered fibers and matrix residues are then recombined or compounded with virgin polymers to **create new composite formulations**. Resins, additives or compatibilizers may be introduced to enhance performance. Coloring is added if so required by the client.

In the following step, the recycled material is processed into semi-finished goods (e.g., panels, brackets) tailored to the Slovenian producer's application. When necessary, a certification of the material is carried out to determine characteristics such as mechanical properties, thermal resistance, and compliance with any existing standards.



**PANELS MADE WITH RECYCLED FIBER-REINFORCED COMPOSITES**

In our case, after the processing of the waste, the Recycler then proceeds to produce new materials, according to technical specifications provided to the Slovenian Waste producer, now as a functional input into their production system. Ideally, these products should be designed with **end-of-life** principles, that is: constructed in such a way that maximizes the chances for reparability, reuse and further recovery and recycling.

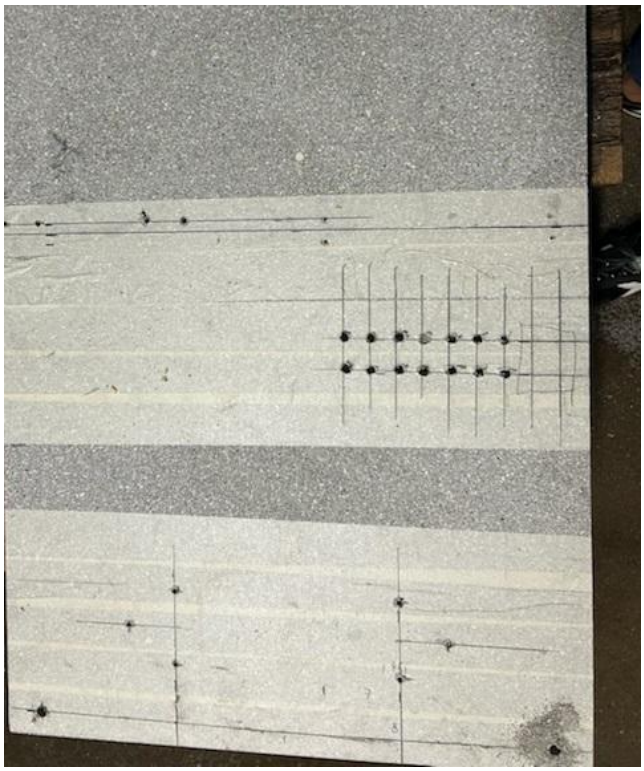
## 4.3 Reintegration of Recycled FRC

After this stage the recycled and reprocessed FRC material is returned to the Slovenian Waste producer, now as a functional input into their production system or as a part of their production facility.

In this case the material is delivered as any other good by any carrier authorized to transport goods in the EU. The receiving company checks the goods and proceeds to implement them in their own production lines.

Depending on the material performance, applications may include structural parts, housing panels, non-load bearing components, coatings, etc.

The performance of the recycled material is monitored throughout the production process, with iterative adjustments to composition or processing parameters as needed. **Technical feedback** is sent to the Italian recycler to continually refine the recycling process based on actual production performance and evolving requirements.



**PREPARATION OF THE PANEL FOR INSTALATION**

**PANEL INSTALATION IN PUBLIC POOL MACHINE ROOM**



Once that the recycled material is finally reintroduced into the production line, it can be stated that resource circularity has been achieved. Direct environmental benefits achieved through such closed looped systems are resource efficiency, lower greenhouse gas emissions, lower energy consumption.

Il progetto RECREATE è co-finanziato dall'Unione europea nell'ambito del Programma Interreg VI-A Italia-Slovenia.
Projekt RECREATE sofinancira Evropska unija v okviru Programa Interreg VI-A Italija-Slovenija.

# 5. Technical and performance requirements

Products made from recycled fiber-reinforced composites should have comparable performance to products made with for example wood or MDF, or with thermoplastics. For our purposes, we will focus on panels, which offer a wide range of applications and is the most common product made with recycled FRCs. However, it important to state that panels made with recycled fiber-reinforced composites have quite **distinct characteristics compared to virgin materials**.

One important aspect to consider is that the performance of the material heavily depends on the source material, the recycling process (mechanical, chemical…) the fiber type and the re-manufacturing process (compression molding, extrusion, resin transfer molding, etc.). We should also note that the percentage of recycled FRCs in the new materials can vary, and panels always include a part of virgin materials, as well as resins and possibly coloring.

It is therefore difficult to provide exact technical and performance characteristics of the recycled product, since there are too many variables that can impact the final product. Generally speaking, though, the performance of panels made with recycled FRC's cam be summed up as follows:

**Strength**

Although the recycling process—whether mechanical, thermal, or chemical—may shorten fibers and slightly reduce their original tensile strength, the resulting **panels still retain significant mechanical performance due to the inherent properties of the reinforcing fibers**. The recycled fibers provide high stiffness and impact resistance compared to conventional plastics or wood-based panels, while the composite matrix ensures dimensional stability and durability. In many cases, the **strength of recycled FRC panels is sufficient for use in construction, transportation, and furniture applications**, where weight reduction and sustainability are equally important as maximum load-bearing capacity. This makes recycled FRC panels a reliable, resource-efficient alternative to virgin composite or traditional material solutions.



**Performance**

Recycled fiber-reinforced composite panels demonstrate a robust performance profile across thermal and mechanical properties, maintaining many of the advantages of virgin composites. The embedded glass or carbon fibers contribute to **high stiffness and flexural strength**, allowing the panels to withstand mechanical loads while remaining relatively lightweight. Thermally, these panels exhibit low thermal conductivity compared to metals, making them suitable for applications where insulation or thermal stability is required. They also show **good resistance to temperature fluctuations, with minimal expansion or warping under heat**, owing to the dimensional stability imparted by the fibers. Additionally, recycled composites maintain strong fatigue and impact resistance, which supports long-term durability in demanding environments. While their peak performance may not match that of virgin fiber composites, recycled panels offer a **reliable balance of stiffness, thermal stability, and resilience**, making them a versatile material choice in construction, automotive, and furniture sectors.

**Durability**

Recycled fiber-reinforced composite panels **offer high durability,** maintaining structural integrity under long-term environmental and mechanical stresses. The polymer matrix provides strong resistance to moisture absorption, preventing swelling, warping, or loss of stiffness that can occur in wood- or gypsum-based panels. Their low water uptake (Uw) ensures **stable thermal and mechanical performance even in humid or outdoor conditions**. The reinforcing fibers further enhance fatigue resistance, allowing the panels to endure repeated loading without significant loss of strength or stiffness. Over time, the material demonstrates excellent dimensional stability and resistance to degradation from thermal cycling, UV exposure, and mechanical wear, especially when protective coatings or surface treatments are applied. In addition, recycled composites display **good chemical resistance against oils, fuels, and many solvents**, which further extends their service life in demanding environments. While some reduction in long-term strength compared to virgin composites may occur due to shorter fiber lengths, recycled FRC panels remain highly durable, making them a reliable and sustainable solution for applications requiring moisture resistance, load-bearing capacity, and overall longevity.

As mentioned above, the performance of the recycled material varies also due to the different manufacturing processes.

The recovery process patented by Gees Recycling srl, for example can provide panels with the following characteristics:



| | |
|---|---|
| **Density** | 1100 – 1200kg/m3 |
| **Impact resistance** | Moderate, small dents appear at around 10J. |
| **Dimensional stability** | Excellent |
| **Thermal resistance** | Service temperature between -29°C and 80 °C |
| **Durability** | Resistant to corrosion, rot, chemicals |
| **UV/Weathering Resistance** | Good with protective coating. Without coating, small variations of color appear during aging tests. |
| **Processing & Usability** | Machinable with standard woodworking tools (cutting, drilling, CNC).<br><br>Compatible with coatings, laminates, adhesives, and mechanical fasteners.<br><br>Surface quality: smooth finish, available in natural, pigmented, or textured variants. |
| **Application Areas** | Public space products: bins, benches, display elements.<br><br>Construction & furniture: support panels, cladding, interior fittings.<br><br>Fashion/retail sector: mannequins, shop displays, decorative materials. |
| **End-of-life** | Recyclable again through the same mechanical process |

**RECYCLED FRC PANEL USED AS PLATFORM FOR A WATER PUMP**

This is however, the performance of a single recycler using its own recovery techniques and other recycler's performance may differ. It is key that the Waste producer obtains proper information about the performance of the final products, in order to assure a successful integration of the material in the production process.



In conclusion, recycled FRC panels usually offer good density, **moderate strength, good durability, and much better sustainability** than virgin composites. They are rarely used for high-performance structural applications, but are **well-suited for semi-structural or non-structural applications** where weight savings, recyclability, and cost efficiency matter.

# 6. Acquisition contracts

According to EU waste legislation, in particular Directive 2008/98/EC on waste (the Waste Framework Directive) and its subsequent amendments, waste producers are required to ensure that their waste is managed in a safe, traceable, and legally compliant manner. **One of the key obligations is the establishment of formal contracts between the waste producer and the authorized recycling or recovery facility**. Such contracts clearly define the responsibilities of both parties, guarantee that the **waste is transferred only to licensed operators**, and ensure that recovery operations comply with environmental and safety standards. By signing these agreements, companies not only demonstrate compliance with EU law but also secure transparency and accountability in the waste management chain, reducing the risk of illegal disposal and contributing to the circular economy.

In order to perform a closed circular economy loop as described in Section 4, a single contract should ideally regulate the relationships between the parties throughout the whole process. However, Regulation (EC) No 1013/2006 mandates that a contract be in place between notifier and consignee to assure proper disposal or recycling of the waste, which obliges to the waste producer (notifier) to take back the waste if the shipment or recovery/disposal is not completed as intended. Drafting a single contract that includes both recovery and acquisition of the product is therefore too rigid of a solution and implies too many risks.

For this reason, we suggest to prepare 2 distinct contracts: 1 for the recovery of waste, and 1 for the acquisition (buying) of the finished product by the waste producer. This setup ensures compliance with Regulation (EC) No 1013/2006 and with Regulation (EU) 2024/1157, which gradually replace it starting from May 2026[1].



## 6.1 Key elements of contracts for waste recovery

When drafting a Contract for the recovery of waste in accordance with Regulation (EC) No. 1013/2006 on shipments of waste, it is essential to ensure that the agreement clearly defines the parties involved, **the type and quantity of waste** (with reference to the appropriate European Waste Catalogue codes), **and the specific recovery operations to be carried out**. The contract must set out the obligations of the waste producer, the notifier, and the recovery facility, including compliance with all applicable permits and environmental standards. It should also specify the arrangements for the transport of waste, and the obligation to take back waste if the

[1] In 2024, the European Parliament approved Regulation (EU) 2024/1157 which repeals Regulation (EC) No 1013/2006 and introduces stricter rules regarding waste disposal and cross border shipments of waste, as well as dematerialization of shipping documents like Annex VII. For our purposes, we have to note one change that will impact contracts between the parties. In particular, Article 18 envisages the need of a tripartite agreement, involving the "person who arranges the shipment", the "consignee" and the "recovery facility" – only when the “recovery facility” and the “consignee” are not the same entity. As this possibility is in practice not occurring often, we provide sample contract for bipartite agreements only.

shipment or recovery cannot be completed as intended. Furthermore, provisions on record-keeping, certificates of recovery, liability for environmental damage, and dispute resolution are critical to demonstrate compliance with the regulation and to ensure transparency, accountability, and legal certainty.

## 6.2 Key elements of purchase contracts for the acquisition of circular products

When preparing a purchase contract for a product made with recycled materials, it is important to **define the specifications of the product**, including the percentage and type of recycled content, possibly applicable technical standards, **and quality requirements**. The contract should also address compliance with all relevant environmental regulations, where applicable, and eco-label or certification schemes if claimed. Key elements include delivery terms, pricing structures, warranties regarding the recycled origin and performance of the product, and documentation or traceability requirements to prove recycled content. In addition, liability provisions and dispute resolution mechanisms help safeguard both parties.

## 6.3 Key elements of acquisition contracts for research and innovation projects



When acquiring circular products within research and innovation projects, contracts should be designed to reflect the scientific nature of the collaboration. In this scenario, contract for the acquisition of circular products differ from commercial ones, although this does not necessarily mean that products are to be given free of charge.

Therefore, the contract could include standard purchase terms (delivery terms, price, warranty, refunds, etc.), as well as provisions that allow for research and innovation activities.

Particular attention should be given to **specifying the technical characteristics of the products**, such as the proportion of recycled or renewable content, the origin of the recycled material, the composition of the new material and so on. It is also important to ensure that the agreement provides for documentation and traceability of materials, so that research teams can for example analyze the circular value of the products, its further recyclability and so on.

Since these acquisitions are closely tied to innovation goals, clear arrangements should be made for the collection and use of performance data, knowledge sharing, and reporting, while safeguarding intellectual property and confidentiality where necessary.

Just as in a commercial contract, liability arrangements and dispute resolutions should be an integral part of the contract.

*Contracts samples are available as Annexes at the end of this document.*

# 7. Annexes

*Annex 1: Sample contract for recovery of waste*

## CONTRACT FOR THE RECOVERY OF WASTE

*(in accordance with Regulation (EC) No 1013/2006 on shipments of waste)*

### 1. Parties

This Contract ("Agreement") is entered into between:

**Notifier / Person Who Arranges the Shipment**
Name: _____
Address: _____
VAT/registration number: _____
Contact details: _____

**Consignee / Recovery Facility**
Name: _____
Address: _____
VAT/registration number: _____
Contact details: _____

Together referred to as "the Parties."



### 2. Legal Basis

This Agreement is concluded pursuant to **Regulation (EC) No 1013/2006** on shipments of waste, in particular Articles **5, 16, 18, 22, and 24**, and Annex VII.

### 3. Definitions

For the purposes of this Agreement:

**"Waste"** means the material identified in Article 4, classified in accordance with the European Waste Catalogue (EWC) and, where applicable, the Basel code.

**"Notifier"** means the person arranging the shipment in accordance with Article 2(15) of Regulation 1013/2006.

**"Consignee"** means the natural or legal person under the jurisdiction of the country of destination who arranges for recovery of the waste.

Il progetto RECREATE è co-finanziato dall'Unione europea nell'ambito del Programma Interreg VI-A Italia-Slovenia.
Projekt RECREATE sofinancira Evropska unija v okviru Programa Interreg VI-A Italija-Slovenija.

**"Recovery Facility"** means the facility undertaking the recovery operation, duly permitted under applicable law.

## 4. Subject Matter

The Notifier agrees to ship, and the Consignee agrees to receive and recover, the following waste:

- **Name of waste:** _____
- **EWC code:** _____
- **Basel code (if applicable):** _____
- **Recovery operation (as per Annex II of Directive 2008/98/EC):** _____
- **Total intended quantity:** _____ (tons)
- **Intended period of shipment:** from xx.xx.xx.xx to xx.xx.xx.

## 5. Obligations of the Parties

The parties to this agreement, shall comply with the requirements of Regulation (EC) No 1013/2006 in respect of the shipment of waste referred to in Article 3(2) (Annex III GREEN LIST) of this Regulation.



**The obligations of the Notifier / Person Who Arranges the Shipment are the following:**

a) Ensure shipments are accompanied by a duly completed **Annex VII document**.

b) Sign Annex VII before shipment begins.

c) Verify that the transporter(s) used are **authorized and licensed** for cross-border waste transport in all countries through which the shipment is transported.

d) Ensure correct classification, packaging, and labelling of waste.

**The obligations of the Consignee / Recovery Facility are the following**

e) Receive and recover the waste strictly in accordance with this Agreement, the Annex VII document, and applicable laws.

f) Sign Annex VII upon receipt of the waste.

g) Provide a **certificate of recovery** as required under Article 16(e).

h) Where recovery cannot be completed as intended, arrange for alternative recovery or disposal in compliance with Articles 22 and 24.

## 6. Financial and Liability Provisions

a) The **Notifier** shall bear all costs of transport and recovery unless otherwise agreed.

b) Where a shipment cannot be completed as intended or is deemed illegal, the Notifier shall take back the waste at its own cost, unless insolvent, in which case the Consignee shall ensure alternative recovery or disposal.
c) Each Party shall indemnify the other against damages, penalties, or liabilities arising from non-compliance with their obligations under this Agreement.

## 7. Duration and Validity

a) This Agreement enters into force on the date of signature by both Parties.

b) It remains valid until all shipments under the Annex VII document(s) are completed and the recovery operation has been certified by the Recovery Facility.

c) It may be terminated earlier by mutual agreement or in case of material breach by one Party, without prejudice to obligations already accrued.

## 8. Force Majeure

Neither Party shall be held liable for failure to perform obligations under this Agreement if such failure is due to events beyond their reasonable control, including but not limited to natural disasters, government restrictions, armed conflict, or industrial action.



## 9. Governing Law and Dispute Resolution

a) This Agreement shall be governed by and construed in accordance with the laws of _____ (country of dispatch, unless otherwise agreed).
b) Any disputes arising under this Agreement shall first be resolved amicably between the Parties. Failing amicable settlement, disputes shall be submitted to the competent courts of _____ (jurisdiction) or, if agreed, arbitration under the rules of _____.

## 10. Miscellaneous

a) This Agreement constitutes the entire agreement between the Parties and supersedes prior understandings or agreements relating to its subject matter.

b) Amendments must be made in writing and signed by both Parties.

c) Copies of this Agreement shall be kept available for inspection by competent authorities.

Date

| | |
|---|---|
| **Notifier:** | **Consignee / Recovery Facility:** |
| Name & Title: | Name & Title: |
| Signature: | Signature: |



Il progetto RECREATE è co-finanziato dall'Unione europea nell'ambito del Programma Interreg VI-A Italia-Slovenia.
Projekt RECREATE sofinancira Evropska unija v okviru Programa Interreg VI-A Italija-Slovenija.

*Annex 2: Sample Purchase contract*

# PURCHASE AGREEMENT

for [*insert commercial name of the circular product manufactured with recycled fiber-reinforced composites*]

**BETWEEN**

[*Buyer's name, full address, country of incorporation*] company duly incorporated and existing under the laws of [Buyer's Country], with its registered office at [...], tax code/VAT number [...], duly represented by [...], in his/her capacity as [...] (hereinafter, the "Buyer");

**AND**

[*Seller's Name, full address, country of incorporation*], tax code/VAT number [...], duly represented by [...], in his/her capacity as [...] (hereinafter, the "Seller");

The Buyer and the Seller are hereinafter jointly referred to as the "Parties", and individually as a "Party".

**RECITALS**

The Seller is engaged in the manufacture and sale of circular products made with recycled fiber-reinforced composites, produced in compliance with applicable European Union and Italian legislation, including but not limited to Directive 2008/98/EC on waste (Waste Framework Directive) and subsequent amendments.



The Buyer intends to purchase from the Seller, and the Seller agrees to supply to the Buyer, such products under the terms and conditions set forth herein.

## 1. Subject Matter

1.1 The Seller undertakes to supply, and the Buyer undertakes to purchase, the products made with recycled fiber-reinforced composites (the "Products").

1.2 The Products shall comply with the following technical specifications: [*Insert technical specifications here: e.g. product type, dimensions, composition, quality standards, certifications, structural stability and durability requirements, aesthetics, environmental and packaging criteria*].

## 2. Quantity, Delivery and Transfer of Risk

2.1 The quantities of the Products to be supplied shall be as follows: [*Insert quantity and delivery schedule here*].

2.2 Delivery shall be made at the Buyer's designated address: [*Insert delivery location/address here*].

2.3 Risk of loss or damage to the Products shall pass to the Buyer upon delivery. Title shall pass upon full payment of the relevant invoice.

## 3. Price and Payment Terms

3.1 The purchase price of the Products shall be: [*Insert price per unit / per ton / total contract value*].

3.2 The Buyer shall effect payment of the purchase price within [...] days from the date of invoice, by bank transfer to the Seller's bank account as indicated on the invoice.

3.3 Any delay in payment shall entitle the Seller to interest in accordance with [*add country law*], as amended, without prejudice to any further damages.

## 4. Compliance and Product Requirements

4.1 The Seller warrants that the Products shall:

(a) conform to the specifications described in Clause 1.2;

(b) be manufactured in accordance with applicable EU national legislation on recycled materials and waste recovery, including Directive 2008/98/EC (Waste Framework Directive) and subsequent amendments;

(c) be free from defects in materials and workmanship.

4.2 The Seller shall provide the Buyer with all certificates, declarations of conformity, and supporting documentation demonstrating the recycled origin and lawful treatment of the fiber-reinforced composites used in the manufacture of the Products.

## 5. Obligations of the Parties

**Seller Obligations:**

- Deliver the Products in accordance with this Agreement and applicable laws;

- Ensure compliance with all environmental, health, and safety regulations in production and supply;



- Promptly inform the Buyer of any circumstance that may affect the delivery or conformity of the Products.

**Buyer Obligations:**

- Submit purchase orders in accordance with the agreed delivery schedule;

- Pay the purchase price within the agreed time limits;

- Ensure proper handling, storage, and use of the Products after delivery.

## 6. Warranty and Liability

6.1 The Seller warrants the Products for a period of [... months] from the date of delivery.

6.2 In the event of non-conformity or defect, duly notified in writing by the Buyer within [... days] of discovery, the Seller shall, at its own expense and option, repair, replace, or reimburse the defective Products.

6.3 Except in cases of fraud, gross negligence, or willful misconduct, neither Party shall be liable for indirect, incidental, or consequential damages.

## 7. Term and Termination

7.1 This Agreement shall enter into force on [...] and shall remain valid until [...], unless otherwise extended or terminated in accordance with the provisions herein.

7.2 Each Party may terminate this Agreement by written notice in case of material breach by the other Party, provided that such breach is not remedied within [... days] from receipt of written notice.

## 8. Confidentiality

8.1 Each Party shall treat as confidential all information, data, and documents exchanged under this Agreement and shall not disclose such information to third parties without the prior written consent of the other Party, except as required by law.

## 9. Governing Law and Dispute Resolution

9.1 This Agreement shall be governed by and construed in accordance with the laws of Italy.

9.2 Any dispute arising out of or in connection with this Agreement shall be submitted to the exclusive jurisdiction of the courts of [*City*, Italy].

## 10. Final Provisions

10.1 This Agreement constitutes the entire agreement between the Parties and supersedes all prior understandings, representations, and agreements, whether oral or written.

10.2 Any amendment or modification to this Agreement shall be valid only if made in writing and signed by duly authorized representatives of both Parties.

10.3 If any provision of this Agreement is held invalid or unenforceable, the remaining provisions shall remain in full force and effect.

## IN WITNESS WHEREOF



the Parties hereto have executed this Agreement in two originals, each Party acknowledging receipt of one duly signed copy.

On behalf of the Buyer: _____

Name: [...]
Title: [...]
Date: [...]

On behalf of the Seller: _____

Name: [...]
Title: [...]
Date: [...]

*Annex 3: Contract for research and innovation projects*

# PURCHASE AGREEMENT

for [*insert commercial name of the circular product, or the material manufactured with recycled fiber-reinforced composites*

**BETWEEN**

[*Buyer's name, full address, country of incorporation*] company duly incorporated and existing under the laws of [Buyer's Country], with its registered office at [...], tax code/VAT number [...], duly represented by [...], in his/her capacity as [...] (hereinafter, the "Buyer");

**AND**

[*Seller's Name, full address, country of incorporation*], tax code/VAT number [...], duly represented by [...], in his/her capacity as [...] (hereinafter, the "Seller");

The Buyer and the Seller are hereinafter jointly referred to as the "Parties", and individually as a "Party".

**RECITALS**



The Seller is engaged in the manufacture and sale of circular products made with recycled fiber-reinforced composites, produced in compliance with applicable European Union and Italian legislation, including but not limited to Directive 2008/98/EC on waste (Waste Framework Directive) and subsequent amendments.

The Buyer intends to purchase from the Seller, and the Seller agrees to supply to the Buyer, such products under the terms and conditions set forth herein, with the understanding that the Buyer may use the Products for research and innovation purposes.

## 1. Subject Matter

1.1 The Seller undertakes to supply, and the Buyer undertakes to purchase, the circular products made with recycled fiber-reinforced composites (the "Products").

1.2 The Products shall comply with the following technical specifications: [*Insert technical specifications here: e.g. product type, dimensions, composition, quality standards, certifications, structural stability and durability requirements, aesthetics, environmental and packaging criteria*].

1.3 The Buyer shall be entitled to use the Products not only for ordinary commercial purposes but also for research, testing, analysis, prototyping, and innovation activities, including but not limited to laboratory trials, pilot projects, and the development of new applications and processes.

## 2. Quantity, Delivery and Transfer of Risk

2.1 The quantities of the Products to be supplied shall be as follows: [*Insert quantity and delivery schedule here*].

2.2 Delivery shall be made under at the Buyer's designated address: [*Insert delivery location/address here*].

2.3 Risk of loss or damage to the Products shall pass to the Buyer upon delivery. Title shall pass upon full payment of the relevant invoice.

## 3. Price and Payment Terms

3.1 The purchase price of the Products shall be: [*Insert price per unit / per ton / total contract value*].

3.2 The Buyer shall effect payment of the purchase price within [...] days from the date of invoice, by bank transfer to the Seller's bank account as indicated on the invoice.

3.3 Any delay in payment shall entitle the Seller to interest in accordance with Legislative Decree no. 231/2002, as amended, without prejudice to any further damages.

## 4. Compliance and Product Requirements

4.1 The Seller warrants that the Products shall:

(a) conform to the specifications described in Clause 1.2;

(b) be manufactured in accordance with applicable EU and Italian legislation on recycled materials and waste recovery, including Directive 2008/98/EC (Waste Framework Directive) and subsequent amendments;

(c) be free from defects in materials and workmanship.

4.2 The Seller shall provide the Buyer with all certificates, declarations of conformity, and supporting documentation demonstrating the recycled origin and lawful treatment of the fiber-reinforced composites used in the manufacture of the Products.



## 5. Obligations of the Parties

**Seller Obligations:**

- Deliver the Products in accordance with this Agreement and applicable laws;

- Ensure compliance with all environmental, health, and safety regulations in production and supply;

- Promptly inform the Buyer of any circumstance that may affect the delivery or conformity of the Products.

**Buyer Obligations:**

- Submit purchase orders in accordance with the agreed delivery schedule;

- Pay the purchase price within the agreed time limits;

- Ensure proper handling, storage, and use of the Products after delivery, including any research and innovation use in compliance with applicable laws and safety standards.

## 6. Warranty and Liability

6.1 The Seller warrants the Products for a period of [... months] from the date of delivery.

6.2 In the event of non-conformity or defect, duly notified in writing by the Buyer within [... days] of discovery, the Seller shall, at its own expense and option, repair, replace, or reimburse the defective Products.

6.3 Except in cases of fraud, gross negligence, or willful misconduct, neither Party shall be liable for indirect, incidental, or consequential damages.

## 7. Intellectual Property Rights

7.1 All intellectual property rights, industrial property rights, know-how, and trade secrets owned by the Seller prior to or outside the scope of this Agreement ("Background IP") shall remain the exclusive property of the Seller.

7.2 Any data, results, inventions, prototypes, designs, or processes arising from the Buyer's research and innovation activities carried out using the Products ("Foreground IP") shall be the exclusive property of the Buyer, unless otherwise agreed in writing by the Parties.

7.3 Nothing in this Agreement shall be construed as granting to the Buyer any rights or licenses under the Seller's Background IP, other than the limited right to use the Products in accordance with Clause 1.3.

## 8. Term and Termination

8.1 This Agreement shall enter into force on [...] and shall remain valid until [...], unless otherwise extended or terminated in accordance with the provisions herein.

8.2 Each Party may terminate this Agreement by written notice in case of material breach by the other Party, provided that such breach is not remedied within [... days] from receipt of written notice.



## 9. Confidentiality

9.1 Each Party shall treat as confidential all information, data, and documents exchanged under this Agreement and shall not disclose such information to third parties without the prior written consent of the other Party, except as required by law.

9.2 The Buyer may publish scientific or technical results obtained from the research and innovation use of the Products, provided that no confidential information of the Seller is disclosed, and provided further that any reference to the Seller as the supplier of the Products shall require the Seller's prior written consent.

## 10. Governing Law and Dispute Resolution

10.1 This Agreement shall be governed by and construed in accordance with the laws of Italy.

10.2 Any dispute arising out of or in connection with this Agreement shall be submitted to the exclusive jurisdiction of the courts of [*City*, Italy].

## 11. Final Provisions

11.1 This Agreement constitutes the entire agreement between the Parties and supersedes all prior understandings, representations, and agreements, whether oral or written.

11.2 Any amendment or modification to this Agreement shall be valid only if made in writing and signed by duly authorized representatives of both Parties.

11.3 If any provision of this Agreement is held invalid or unenforceable, the remaining provisions shall remain in full force and effect.

**IN WITNESS WHEREOF**

the Parties hereto have executed this Agreement in two originals, each Party acknowledging receipt of one duly signed copy.

On behalf of the Buyer: _____

Name: [...]
Title: [...]
Date: [...]

On behalf of the Seller: _____

Name: [...]
Title: [...]
Date: [...]



Il progetto RECREATE è co-finanziato dall'Unione europea nell'ambito del Programma Interreg VI-A Italia-Slovenia.
Projekt RECREATE sofinancira Evropska unija v okviru Programa Interreg VI-A Italija-Slovenija.

# 8. References

Roadmap towards the Circular Economy in Slovenia. https://circulareconomy.europa.eu/platform/sites/default/files/roadmap_towards_the_circular_economy_in_slovenia.pdf (Retrieved 25.08.2025)

Development strategy of Slovenia 2030 (in Slovenian language). https://www.gov.si/assets/ministrstva/MKRR/Strategija-razvoja-Slovenije-2030/Strategija_razvoja_Slovenije_2030.pdf (Retrieved 25.08.2025)

Slovenian Environmental Protection act ZVO- 2 (in Slovenian language).

https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina/2022-01-0873/zakon-o-varstvu-okolja-zvo-2?h=zakon%20o%20varstvu%20okolja (Retrieved 25.08.2025)

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.

https://eur-lex.europa.eu/eli/dir/2008/98/oj/eng (Retrieved 25.08.2025)

Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste.

https://eur-lex.europa.eu/eli/reg/2006/1013/oj/eng (Retrieved 25.08.2025)



Regulation (EU) 2024/1157 of the European Parliament and of the Council of 11 April 2024 on shipments of waste, amending Regulations (EU) No 1257/2013 and (EU) 2020/1056 and repealing Regulation (EC) No 1013/2006.

https://eur-lex.europa.eu/eli/reg/2024/1157/oj/eng (Retrieved 25.08.2025)