

## Flax-Linen & Hemp fibre composites

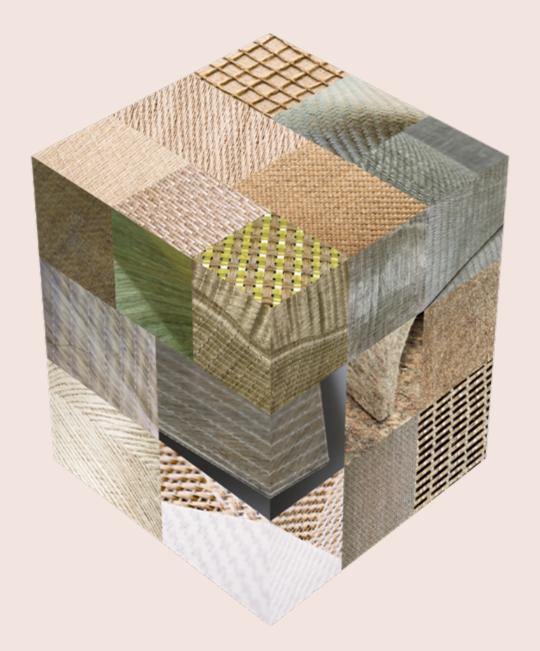


JEC WORLD Event - April 25-27, 2023

Hall 5 Booth C43 - Natural Fibres Village

Alliance for European Flax-Linen & Hemp Hosts, in partnership with JEC Group, an Expanded Natural Fibres Village at JEC World 2023.

It confirms Flax and Hemp as the premium natural fibres for composites.



#### Introduction

As renewable European resources, Flax and Hemp fibres are becoming an ever more important asset for the bioeconomy, the combination of their exceptional mechanical and environmental performances are amplifying and accelerating sustainable innovation, particularly in the advanced composites market.

Responding to increasing demand from manufacturers for reinforcements that are scientifically proven to be both sustainable and high-performing, Alliance for European Flax-Linen & Hemp (previously known as the European Confederation of Flax and Hemp | CELC) will once again partner with JEC Group to host an expanded Natural Fibre Village at JEC World 2023.

Presenting its new name and identity for the first time at JEC World - Alliance for European Flax-Linen & Hemp - highlights a newly restructured European industry which brings together the entire Flax and Hemp value chain around a common goal: to make European Flax-Linen and Hemp the preferred sustainable premium fibres worldwide for fashion, technical textiles, and natural fibre composite applications.

In addition, the Alliance's future development pathway will be focused around three newly defined strategic pillars:

- Enhancing its work in publishing structured, proven scientific and economic data on a regular basis, to continuously deploy the best set of specific decisionmaking support tools.
- Transforming the Alliance for European Flax-Linen & Hemp into an innovative and sustainable international reference which continuously improves its environmental footprint through two essential elements: traceability and Life Cycle Analysis.
- Guaranteeing quality and better describing the quality of its fibres by using technological innovations to create a reference for describing long fibres.

The sector is well supported by the key European  $Flax^{TM}$  brand. European  $Flax^{TM}$  is the indispensable passport of premium Flax fibres grown in Western Europe and is both a certificate of origin and an absolute guarantee of traceability.

As Flax and Hemp fibres and their associated supply chains continue to mature, the industry, reinforced by the strength of the Alliance for European Flax-Linen & Hemp, has now proved that it can fulfill the composite industry's requirements in terms of performance, consistency, technical expertise, and reliability. Matched by the intrinsic environmental benefits of Flax and Hemp, natural fibre composites now provide a compelling argument for increased adoption in the composite landscape of the future.

"As renewable European resources, Flax and Hemp fibres are a major asset for the bioeconomy. Their combination of exceptional mechanical and environmental performance is amplifying and accelerating sustainable innovation in composites. The multitude of fully commercialized Flax and Hemp fibre products displayed at JEC World 2023 validates our work in successfully communicating the possibilities, and confirming with scientific proof, that Flax and Hemp fibres and their composite solutions meet manufacturer expectations in terms of performance and anticipate future demands for sustainable development from both industrial customer and final consumer."

#### Valentin Depestele

President of the Technical Uses section Alliance for European Flax-Linen & Hemp



## How Flax adds value to composites

European Flax<sup>™</sup>, a certification of origin that meets all customers' expectations.

The guarantee of traceability for premium quality natural Flax fibres grown in Western Europe.



#### **SUSTAINABILITY**

- ENTIRELY RENEWABLE RESOURCE
- **NO IRRIGATION** [barring exceptional circumstances]
- NO GENETICALLY MODIFIED ORGANISMS [GMOS]
- NO DEFOLIANT
- ROTATED CROP
- 100% MECHANICAL FIBRE EXTRACTION
- ZERO WASTE
- ETHICAL PRODUCTION

#### **PERFORMANCE**

- LOW WEIGHT
- HIGH SPECIFIC STIFFNESS
- IMPACT RESISTANT
- VIBRATION DAMPING
- THERMAL AND ACOUSTIC INSULATION
- RADIO TRANSPARENT
- MULTI-MATERIAL HYBRIDIZATION
- END-OF-LIFE OPTIMIZATION
- LOW ENVIRONMENTAL IMPACT

#### **KEY FIGURES\***

3/4

of world fibre production from France, Belgium, Netherlands +133%

increase in cultivated surface area in 10 years

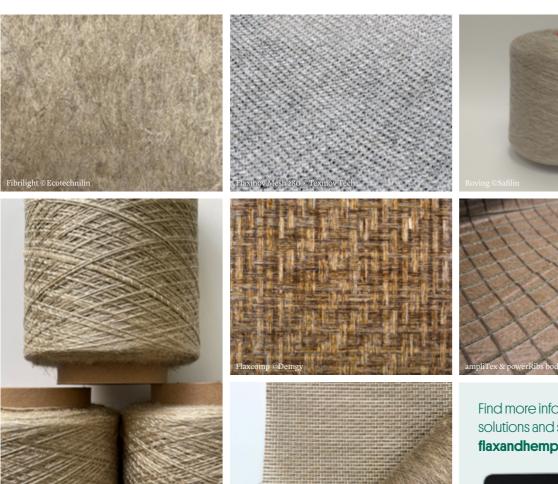
268 000 tonnes

of fibres in 2022

Alliance Economic Observatory

## Flax and Hemp material formats for composites

Alliance members work with a broad range of Flax-Linen and Hemp fibres to create raw materials and intermediate products including yarns, rovings, technical textiles (two-dimensional woven, hybrids, unidirectional, non-crimp, warp knitted and non-woven), prepregs, consolidated panels and laminates.







# Alliance for European Flax-Linen & Hemp presents latest technical report on vibration damping as well as key updates to environmental analysis datasets

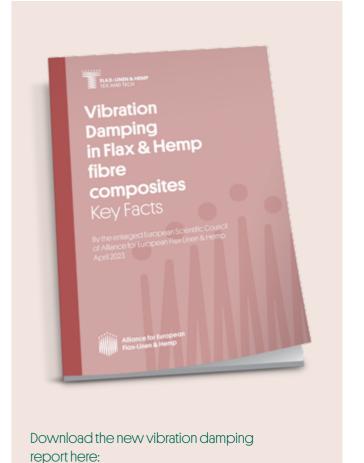
The Alliance promotes both the sustainability credentials and the many advantageous properties of Flax and Hemp in its work to enable the most innovative natural fibre solutions. It takes the technical lead for the industry, and as the only European agro-industrial organization federating all the stages of the production and transformation of Flax and Hemp, the Alliance has pioneered the development of scientifically verified data and reports to allow manufacturers to better evaluate their environmental footprint.

At JEC World 2023, Alliance for European Flax-Linen & Hemp will add a new technical report to their open-source library. Titled "Vibration Damping in Flax & Hemp Fibre Composites", the new report was written by the experts of the Alliance's enlarged European Scientific Council. It is based on the literature review of Taiqu Liu, Pauline Butaud, Vincent Placet and Morvan Ouisse from the FEMTO-ST Institute, University of Bourgogne Franche-Comté, France and includes additional contributions from Alliance members, making this report the most comprehensive subject review available to date.

Flax and Hemp fibre composites represent extremely good choices for light-weight composite applications due to their excellent mechanical properties, low density, and minimal environmental footprint. Moreover, Flax and Hemp fibre composites have outstanding vibration and sound damping properties leading to quieter surroundings, enhanced user comfort and improved safety in many applications.

The new Alliance report contains highlights of scientific literature which allow the damping properties of Flax and Hemp fibre composites to be positioned alongside a broad range of materials. Furthermore, influential factors on the damping performance are discussed, including the effect of the matrix selected, porosity content and moisture absorption.

Presenting the key facts relating to vibration damping, this new document is the second technical report presented by the Alliance's European Scientific Council, following the Moisture Sensitivity Guidelines published in 2022.



news.europeanflax.com/outils

## Enhancing the Environmental Trajectory for European Flax-Linen – Data Updates for 2023-2024

With European Flax™ as the benchmark raw material, the Alliance has previously led the way in detailed life cycle analysis (LCA) studies for natural fibres. At JEC World 2022, it presented a full LCA study for European Flax™ scutched long fibre that used the new European Comission recognized Product Environmental Footprint (PEF) method. The first agro-industrial body to measure its environmental impact according to these criteria, it delivers proven scientific data from European Flax™ fibre grown and processed in France, Belgium, and the Netherlands. This important dataset has since been updated and re-released in early 2023 using the framework of the European Commission's database EF 3.1, thanks to the collaboration between the Alliance and the EC's data providers.

The Alliance also recognizes that its work to help composite manufacturers increase the understanding of their environmental footprint requires further work to measure the impacts of each downstream process in the Flax-Linen value chain not so far included in the scutched fibre LCA. This ongoing program engages the whole value chain to produce collective data on an EU level for each process, both for long and short fibre, that considers rescutched short fibre, hackling, carding/combing, cottonising, preparation and wet & dry spinning. In addition, the Alliance also supports its members with help and tools allowing them to manage their individual data and trajectories in order to enhance their responsible practices and track improvement.

The Alliance aims to release the data set for short fibres by the second half of 2023, which will provide invaluable LCA input data for a wide range of composite applications. Then, in 2024, collective data for each process will be made available in European databases (PEF).

"Ecoinvent is happy to collaborate with Alliance to deliver European Flax™ fibre data for the European Commission Product Environmental Footprint (PEF). We look forward to continuing this partnership and to including the data in the ecoinvent database. As flax fibre is currently being used in many sectors and the provenance of the fibre is mainly from within Europe, this data will be highly relevant to the thousands of users working with our data."

#### Lucia Valsasina

Database Content Lead, Ecoinvent

Alliance for European Flax-Linen & Hemp and its Scientific Council has also co-published three technical publications with the JEC Group that provide detailed market insight and an overview of the optimum processing methods and possibilities when using Flax and hemp for the production of composites.

Alliance for European Flax-Linen & Hemp is working with the ecoinvent Association to implement for the first time the European Flax™ scutched fibre dataset in ecoinvent's Life Cycle Inventory (LCI) database.

The European Flax™ fibre grown and transformed in Western Europe accounts for 3/4 of the world's flax long fibre production. Consequently, this dataset will be fully representative of European practices and will enable reliable impact calculations for products made from European Flax™ fibre, for users of ecoinvent data. Expected 2nd semester 2023.

ecoinvent is a not-for-profit association based in Zurich, Switzerland, whose mission is to provide world leading environmental data, especially within the ecoinvent database, which is available through the main LCA software tools.





## Alliance for European Flax-Linen & Hemp members showcase Flax and Hemp composites solutions

Alliance and its members will be highly visible at JEC World 2023. Once again partnering with JEC Group to host the "Natural Fibres Village" at JEC World 2023 that will bring together the leading players in the Flax and Hemp fibre value chain and showcase the dynamism of the industry.

Located in **Hall 5**, the Alliance booth in "Natural Fibres Village" will showcase the high-performance properties of its market leading European Flax<sup>TM</sup> label, present its latest vibration damping technical reports, and highlight

the variety of renewable raw materials, intermediates and product solutions developed by its members.

Throughout the Natural Fibre Village, on the Innovation Planets, and around the show, Alliance members will exhibit a vast range of innovative products presenting a broad diversity of composite applications across the aerospace, automotive, mobility, marine, sports & leisure, industrial and design & lifestyle sectors from high-performance racquets to lightweight sportscar body components.



## Meet the key industry players and members of the Alliance's Technical Section on the JEC Natural Fibre Village:

#### **ALLIANCE FOR EUROPEAN FLAX-LINEN & HEMP** – FR

HALL 5, C43

#### www.allianceflaxlinenhemp.eu

Bringing together all players in the European Flax-Linen & Hemp value chain and supporting sourcing

**BCOMP**-CH

**HALL 5, A45** 

#### www.bcomp.ch

High-performance natural fibre reinforcements for sustainable lightweighting

**CULTURE IN**-FR

**HALL 5, A51** 

#### www.varian.culturein.eu

Creators of Varian®, a material half way between a composite material and a textile

**DEMGY**-FR

**HALL 5. B46** 

#### www.demgy.com

Injection, thermoforming, and additive manufacturing solutions

**DEPESTELE** – FR

**HALL 5, C39** 

#### www.groupedepestele.com

100% Flax and hybrid woven reinforcements from untwisted Flax rovings

#### **ECOTECHNILIN**-FR

**HALL 5. B51** 

#### www.eco-technilin.com

Natural fibre solutions for industrial markets

#### FLIPTS & DOBBELS - FLAXCO - BE

HALL 5. B50

#### www.flaxco.be

Thermoplastic prepregs with woven Flax fibre and Flax fibre composite panels

**SAFILIN**-FR

**HALL 5, C45** 

#### www.safilin.fr

Low-twist Flax roving and yarns as wells as a range of woven flax technical textiles

TERRE DE LIN-FR

**HALL 5. C49** 

#### www.terredelin.com

Specially selected and prepared Flax fibres and rovings for composites

#### **TEXINOV TECH**-FR

**HALL 5, A55** 

#### www.texinov.com

Technical warp knitted textiles

### In addition, Alliance member activities highlighted on the Innovation Planets include:

INDUSTRY PLANETS:

#### BCOMP WITH K2

Touring skis using Bcomp ampliTex™ natural fibre reinforcements

**MOBILITY PLANETS:** 

#### TERRE DE LIN WITH ALPINE

A110 E-ternité with Flax fibre composite parts

#### Flax & Hemp Market Developments

#### **AUTOMOTIVE & MOBILITY**

#### Reducing CO<sub>2</sub> impact with Flax

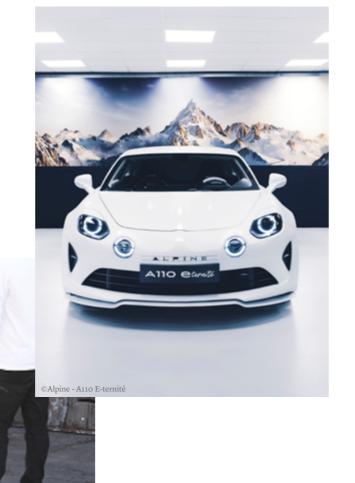
As automotive OEMs respond to legislative targets and search for options to help lower CO2 impact scores across their product ranges, inherently sustainable Flax and Hemp fibres are making an increasingly strong case for a seat at the table.

Using Flax, composites can be produced that possess comparable strength and stiffness to those made with more traditional glass and carbon fibre reinforced plastics but that have a significantly smaller carbon footprint. Further, Flax fibre-reinforced composites can demonstrate better vibration damping properties - reducing noise, vibration and harshness (NVH) - and are not prone to brittle fracture and splintering when they break-making trim and exterior parts safer in the event of a crash.

With automakers also having to contend with significant battery pack weights for their latest electric vehicle offerings, the low density of natural Flax fibres is another important benefit which sportscar specialist **Alpine** and motorcycle builder **Live Wire** have both chosen to explore.

The **Live Wire** electric motorcycle applies natural fibre composites for its bodywork components. Using 100% **Bcomp ampliTex™** reinforcement, the lightweight parts blendhigh-performance with sustainability as the company begins a new era of electrification. **Bcomp** confirms that using Flax in place of carbon fibre significantly reduces the CO2 footprint from cradle to gate, improves vibration damping and offers viable end-of-life solutions.

Also aiming to keep weight to a minimum, French manufacturer Alpine, had a clear project goal in mind: Alpine engineers were to electrify their A110 and without compromising the performance, balance and agility of the current internal combustion engine (ICE) car. Developed and launched in only 12 months, the new Alpine A110 E-ternité is an all-electric road car prototype packed with innovative materials and technologies. The car will serve as a test bed for electric systems and technologies for the next generation of electric **Alpine** vehicles. Within this challenging brief, the team also planned to showcase innovative new materials, working with sustainable Flax materials from Terre de Lin for key vehicle parts. Roof, bonnet skin, rear window, grill, seat backs and rear skirt components were all manufactured in lightweight Flax fibre composite, providing excellent acoustic performance, and helping the new vehicle meet its weight targets.





## Aerospace interiors sector revisits Flax fibre composites

Last year, JEC World 2022 featured several exciting Flax composite applications for the space sector including a low-density Flax prepreg thermal protection system for space-launch vehicles and a structural panel for a satellite that is designed to burn-up completely upon re-entry to the Earth's atmosphere, making it safer for humans, ground infrastructure and the environment than metallic parts.

Since the last JEC show, commercial aerospace manufacturers have continued to progress their developments with Flax fibres, in part to reduce the CO2 impact of the composite structures that make up an increasing percentage of current and future aircraft. Primary and secondary structure components are destined to remain in carbon fibre for performance reasons, however, the aircraft interiors space presents some interesting potential for Flax.

**Lufthansa Technik** began the development of its novel **AeroFLAX** aircraft cabin interior panels made with renewable **Bcomp ampliTex™** and **powerRibs™** reinforcements and a bio-based resin system in 2019. With fire performance critical for such interior applications, one of the most important deliverables was the innovative fibre and resin treatment enabling **AeroFLAX** components to meet the required FAR25.853 standard.

**AeroFLAX** solutions for components such as door frame linings, lavatory shrouds and ceiling & sidewall panels are said to save up to 20% weight versus existing solutions, contributing to significant fuel and CO2 emissions savings throughout the life of the aircraft.

The aerospace industry cannot include new materials purely for sustainability reasons; performance and quality are its key demands. As such, it is still a challenging market for new materials such as Flax with barriers to entry remaining high, but the potential weight savings created by solutions like **AeroFLAX** seem to have captured the attention of the major original equipment manufacturers (OEMs).

Alliance for European Flax-Linen & Hemp continues to support aerospace manufacturers stringent requirements and has committed to guaranteeing and better describing the quality of its fibres by using technological innovations to create a reference for describing long fibres. A description of European Flax $^{\text{TM}}$  fibres through optical imaging will soon complement the organoleptic method.

#### SPORT & LEISURE

#### **Exploiting the vibration damping properties of Flax**

In the sporting goods sector, consumers are willing to invest heavily in materials that combine both performance and sustainability. At JEC World 2023, Alliance for European Flax-Linen and Hemp will present its latest technical report on the excellent vibration damping properties of Flax fibres in composite applications.

These beneficial characteristics have certainly been recognized certain manufacturers in the sporting field, with full or partial Flax fibre constructions creating a softer ride and improved "feel" in products such as racquets, skis, snowboards and kayak paddles.

Babolat have recently introduced innovative technology in its new range of Pure Aero tennis racquets. Known as NF2 TECH (Natural Flax Filtration Technology), the new construction uses Flax fibre inserts, developed with EcoTechnilin, in the handle and at 3 and 9 o'clock on the racquet head to dampen vibrations and deliver optimized acoustics with a much softer sound, for enhanced feeling as a player strikes the ball, compared to the previous model.

The Adidas Metalbone #GREENPADEL offers players a new level of performance thanks to the outstanding vibration damping offered by the Flax fibres that are used to replace carbon and glass fibres typically used in high-end padel racquets. Bcomp ampliTex™ Flax fibres allowed the manufacturer to create a more sustainable racket that doesn't need to hide from its high-end competition made with conventional composite reinforcements.



Flax fibres are making inroads in winter sports too. **ZAG Skis** has also collaborated with **Bcomp** and uses **ampliTex™** Flax fibre composite reinforcements across the SLAP collection. The company states that the Flax fibres impart a smooth ride and provide 250% higher vibration damping than carbon fibres, perfect for even the most demanding freeride skier.

Also applying Flax to their latest generation equipment, **ROME snowboards** is working with **EcoTechnilin** to integrate Flax textile reinforcements into the impact plates and side walls of their boards. The low-density fibres have been shown to improve durability, rigidity and stability without impacting the crucial "feel" of the board.

#### **MARINE**

#### Flax fibre adoption continues to grow

Flax fibre reinforced composites continue to gain traction in the marine market, with major OEMs as well as smaller shipyards now aiming to take advantage of the reduced carbon impact and impressive mechanical properties provided by natural fibre composited.

The **Beneteau Group** is a global market leader for boats and offers 180 leisure boat models from its 10 yachting brands. Working with technical textile partner **Chomarat**, the company was recently shortlisted as a JEC Innovation Award Finalist for its work to integrate a fibreglass/hemp hybrid complex into the industrial scale production of marine composite parts such as deck hatches and locker lids. Aiming to use more sustainable fibres in closed mould processes including low-pressure injection and infusion, the project team developed a stitched Hemp and glass fibre hybrid material that met the customer surface finish requirements as well as being suitable for industrial scale production of tens of thousands of parts per year. The novel Hemp and glass TER2A MAT reinforcement will be on display as part of the JEC Innovation Planets.

In addition to their application in leisure marine markets, Flax fibre composites are also recording some impressive performances on the racecourse. Team Malizia, a 60' IMOCA class yacht competing in The Ocean Race recently won the grueling 14,714 nautical mile 3rd leg of the race from Cape Town, South Africa to Itajaí, Brazil via the Southern Ocean, with several Flax composite hatches and interior components onboard. GREENBOATS manufactured the Flax parts and will display another of their stunning creations, the Flax fibre and bio-epoxy FLAX 27 at JEC World as part of the Innovation Planets and in conjunction with Sicomin / GreenPoxy.



Slightly shorter, but just as successful, is the 40' Class40 yacht, Crosscall. Built in France at Grand Largue Composites to Marc Lombard's Lift V2 design, Crosscall won the hotly contested Class40 World Championship in the summer of 2022. The yacht's cockpit was built with a hybrid biaxial fabric that has 50 per cent Flax content, whilst other parts of the boat that incorporate Flax fibre include the rope tunnel, the engine cover, and ballast tanks. Tight control of the infusion process using Sicomin's GreenPoxy® bio-based resins allowed the build team to bring the Flax reinforced boat out of the shed weighing less than its target design displacement.



Furthermore, following an epic race across the Atlantic, Roland Jourdain, onboard the **Outremer 5X catamaran We Explore** finished the 12th edition of the Route du Rhum in November 2022 in second place. The renowned French sailor's 18-meter long catamaran was largely made with Flax fibres, the first time that a multihull of this size has incorporated so many natural materials.



#### DESIGN & LIFESTYLE

#### Consumer pull for sustainable options

In the design and lifestyle sector, a material's structural performance is not always the most important factor. Visual appearance is key and, as consumers place more weight on environmental footprint considerations when weighing up their decision to buy - sustainable Flax and Hemp fibre materials can deliver an interesting combination of structure, aesthetics and other properties.

Varian®, described by creators CultureiN as halfway between a textile and a composite material, is one such product. A bio-based thermoformable blend of Flax and thermoplastic yarns, Varian® was initially conceived as a functional, decorative, and material option for wall elements, space dividers, ceiling elements, acoustic and lighting solutions. VOC free and with an M1 fire rating, Varian® products are also anti-static and so do not gather dust like traditional plastic parts.

Ease of processing and ready-to-use intermediate products are prerequisites for success in the high-volume design & lifestyle field and both **EcoTechnilin** and **Demgy** have continued to evolve their product offering in this regard. **EcoTechnilin** will use **Kairlin**, a recyclable and compostable Flax fibre-reinforced polylactic acid material, for the furniture on its booth at JEC World 2023. Kairlin can be quickly and simply compression-moulded producing parts are light in weight, easy to machine and that have a pleasing surface finish.

Using a combination of twill weave Flax fibres and a transparent thermoplastic resin, **Demgy** has created a versatile material combination it calls **Flaxcomp® Clear**. Processable via a combination of thermocompression and injection overmoulding, the new material produces lightweight, recyclable parts that translate the beauty of the natural Flax fibres to the final component in high volume applications such as interiors, consumer and luxury goods.



#### **Services**

**ALLIANCE FOR EUROPEAN FLAX-LINEN & HEMP** aims to position European Flax & Hemp as the preferred sustainable and high-performance fibres worldwide.

#### **OUR MISSIONS**











#### **WEINFORM**

Members, industrials and customers

#### **WE SUPPORT**

The European ecosystem and know-how

#### **WE PROMOTE**

European Flax-Linen & Hemp

#### **OPEN EXPERTISES**

European Scientific Council:

- Harmonization
- Standardization
- Dissemination

#### **OPEN SERVICES**

- Assistance in sourcing and innovation
- · Technical support
- Directory of members and solutions
- Marketing tools, trainings
- Traceability: European Flax<sup>TM</sup> certification and ISO standard identification method
- · Sustainability: Environmental footprint trajectory: LCA + datasets PEF compliance

#### **OPEN PROMOTION**

- Tradefairs
- · Technical days
- Publications
- · Professionnal & general public events

#### **About**



The Alliance for European Flax-Linen & Hemp is the only European agro-industrial organization that serves as a global reference and brings together all players in the European Flax-Linen and Hemp value chain.

A platform for reflection, market analysis, dialogue, and strategic orientation, the Alliance for European Flax-Linen & Hemp presides over an industry of excellence in a globalized context. It encourages dialogue with national and European public authorities.

The Alliance for European Flax-Linen & Hemp creates an environment that fosters competitiveness of industrial businesses as part of its three-fold mission of informing members, brands, and consumers, supporting the European ecosystem and European expertise, and promoting European Flax-Linen and Hemp as the preferred sustainable premium fibres worlwide.

It connects 10,000 businesses in 16 European countries and bases its work on the values of solidarity, innovation, scientific validation, and respect for people and planet.

It promotes, initiates, and organizes strategic reflections and research on its fibres to be able to provide all of its interlocutors with evidence-based economic data, environmental information, and reliable scientific evidence.

The Alliance for European Flax-Linen & Hemp strives to increase the international visibility of its fibres, whose technical and environmental properties inspire global creation and open new opportunities for industrial innovation. It guarantees the traceability of Flax fibre thanks to the EUROPEAN FLAXTM and MASTERS OF LINEN<sup>TM</sup> certifications.

With its Technical Section and the European Scientific Council, Alliance for European Flax-Linen & Hemp helps its members move towards the future to discover new opportunities such as high-performing composite products. This Section brings together fibre and semifinished product suppliers, preparers and processors, serving as a bridge between the requirements of the multisegment industry and the value chain's industrialization capacity for technical Flax and Hemp applications.

The Alliance for European Flax-Linen & Hemp is the new name of the CELC, an association founded in 1951. Western Europe is the number one Flax-producing region in the world (France, Belgium, and the Netherlands account for 3/4 of

European Flax<sup>TM</sup>: A traceability guarantee for premium Flax fibres grown in Western Europe for all markets. It is a plantbased fibre, the product of ecofriendly agriculture grown without irrigation\* or GMOs.

barring exceptional circumstances

As the technical authority which unites the European Flax-Linen & Hemp industry, our success is built on transparent communication and the open democratization of our expertise, technical services, and marketing promotion. Innovation and CSR are also key strengths of the Alliance, with our experts available when further information is required. Visits to the Alliance for European Flax-Linen & Hemp research laboratory are also possible on request.

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