Lightweight and sustainable bio-based composites at industrial scale

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UD-Flax 100

Biodegradability meets performance

About UD-Flax 100

UD-Flax 100 is polylactic acid based unidirectional organosheet / prepreg reinforced with flax fibers.

UD-Flax 100, a completely biodegradable organosheet, is a perfect fit for industries looking for **no waste in end-of-use but high performance** as well.

UD-Flax 100 is typically used to manufacture laminated plates or hybrid & sandwich structures.

UD-Flax 100 has near-zero CTE, hence provide a good processing compatibility with carbon fiber reinforced prepregs.

We offer UD-Flax 100 either **in rolls up to 100 cm wide and 50 m long** or as **flat sheets** in required dimensions.

Key Features & Advantages

- Low eco-impact, 100% biodegradable
- High mechanical performance
- A ready-to-use preform to be shaped into varied geometry and structure
- Suitable for thermoforming processes; compression moulding, vacuum moulding, injection overmolding and automated tape laying
- Compatible with varied structures such as woven fabrics, mats and honeycomb
- Clean-tech, produced without effluent, hazardous air pollutants and waste; no VOC emission, non-allergenic
- Affordable; better price/performance than counterparts in the market
- Tailor-made production via customized weight and thickness

Field of Uses

UD-Flax 100 is suitable for any application requiring perfect biodegradability with performance. Just to provide insight, such applications could include, but not limited to the following;

- Completely green consumer product design; e.g. daily-use products, furniture, white-goods
- Interior / biodegradable architecture applications; e.g. indoor accessories for green concept hotels & office spaces
- Composite applications considering the product's end-of-use

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Specifications	
Fiber Content	50%
Weight	325 g/m^2
Thickness	0.25 mm
Width	up to 100 cm
Length	up to 50 m
Density	1.3 g/cm^3

Mechanical Properties*	
Tensile Modulus	11 ± 1 GPa
Tensile Strength	140 ± 15 MPa
Elongation at Break	2 – 2.5 %
Flexural Modulus	8 ± 0.5 GPa
Flexural Strength	105 ± 20 MPa

* UD laminates of 8 plies UD-Flax 100 were tested according to ISO 527 for tensile, ISO 14125 for flexural.

Processing Guidelines

- Suitable with thermoforming processes, contact or IR heater can be used.
- Recommended process temperature is 190 °C - 210 °C.
- No specific precautions in handling and during composite manufacturing is required as UD-Flax is bio-based product.
- No need for cold-chain storage as UD-Flax is a thermoplastic based prepreg
- Recommended storage condition is at moderate temperature, away from humidity and in their original packaging.

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UD-Flax 50

Maximizing the mechanical performance

About UD-Flax 50

UD-Flax is polypropylene based unidirectional organosheet / prepreg reinforced with flax.

UD-Flax 50 is a perfect fit for industries looking for **maximum weight reduction combined with high performance and sustainability**. It also provides good **vibration damping and noise barrier** properties.

UD-Flax 50 is typically used to manufacture laminated plates or hybrid & sandwich structures.

UD-Flax 50 has near-zero CTE, hence provide a good processing compatibility with carbon fiber reinforced prepregs.

We offer UD-Flax 50 either **in rolls up to 100 cm wide and 50 m long** or as **flat sheets** in required dimensions.

Key Features & Advantages

- Low eco-impact, %50 bio-based material (flax)
- High mechanical performance
- Ready to be shaped into varied geometry and structure
- Compatible with thermoforming; compression moulding, vacuum moulding, injection overmolding and automated tape laying processes
- Compatible with varied structures such as such as woven fabrics, mats, honeycomb structures
- Clean-tech, produced without effluent, hazardous air pollutants and waste; no VOC emission, non-allergenic
- Provides cost-effective lightweighting
- Enhance NVH properties of carbon fiber composites
- Adjustable production parameters to change weight, thickness, fiber content, thermoplastic polymer content and type in order to achieve required performance

Field of Uses

UD-Flax 50 is suitable for any application requiring sustainability, high performance weight reduction. Just to provide insight, such applications could include, but not limited to the following;

- Sustainable lightweighting in transportation applications; e.g. weight reduction of interior components (such as parcel shelf, bulkhead, side panels) low weight and green electric vehicle design etc.
- Consumer products applications; e.g acoustic products offering better vibration damping with low weight and sustainable design; nature-feeling surface design of white-goods
- Marine applications; e.g weight reduction in interior decoration such as wall & floor panel, replacing fiber glass applications in yacht & boat

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Specifications	
Fiber Content	50%
Weight	325 g/m^2
Thickness	0.25 mm
Width	up to 100 cm
Length	up to 50 m
Density	1.2 g/cm^3

Mechanical Properties*	
Tensile Modulus	15.5 ± 1 GPa
Tensile Strength	160 ± 15 MPa
Elongation at Break	1.5 – 2 %
Flexural Modulus	8.7 ± 0.5 GPa
Flexural Strength	130 ± 20 MPa

* UD laminates of 8 plies UD-Flax 50 were tested according to ISO 527 for tensile, ISO 14125 for flexural.

Processing Guidelines

- Thermoforming processes are suitable to give required shaped.
- Recommended process temperature is 190 °C - 210 °C.
- Both contact heater and IR heater can be used to heat before shaping.
- No specific precautions in handling and during composite manufacturing is required as UD-Flax is bio-based product.
- No need for cold-chain storage as UD-Flax is a thermoplastic based prepreg
- Recommended storage condition is at moderate temperature, away from humidity and in their original packaging.

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UD-Flax 30

affordability meets satisfying performance!

About UD-Flax 30

UD-Flax® is polypropylene based unidirectional organosheet / prepreg reinforced with flax.

We have designed UD-Flax 30 to provide a **balance** between standard performance and affordability.

UD-Flax 30 is a perfect fit for industries looking for **sustainable solutions but put affordability parameter at the first place** rather than high performance. For recyclable, lightweight but good enough performance composite need, UD-Flax 30 is a ready to use solution.

UD-Flax 30 is typically used either to manufacture laminated plates or hybrid & sandwich structures for varied industries.

UD-Flax 30 has near-zero CTE, hence provide a good processing compatibility with carbon fiber reinforced prepregs.

We offer UD-Flax 30 either in **rolls up to 100 cm wide and 50 m long** or as flat sheets in required dimensions.

Key Features & Advantages

- Low eco-impact, %30 bio-based material (flax)
- Provides balanced price / performance in terms of lightweighting and mechanical performance
- A ready-to-use preform to be shaped into varied geometry and structure
- %50 lower in price than existing UD natural-fiber reinforced tapes in the market
- Compatible with thermoforming processes; compression moulding, vacuum moulding, injection overmolding and automated tape laying
- Compatible with varied structures such as woven fabrics, mats and honeycomb
- Clean-tech, produced without effluent, hazardous air pollutants and waste; no VOC emission, non-allergenic
- Enhance NVH properties of carbon fiber composites
- Adjustable production parameters to change weight, thickness, fiber content, thermoplastic polymer content and type in order to achieve required performance

Field of Uses

UD-Flax 30 is suitable for any application requiring sustainability, balanced performance, weight reduction. Just to provide insight, such applications could include, but not limited to the following;

- Weight reduction with limited sustainability of automotive interior components; e.g. electric vehicle part design looking for moderate mechanical strength, low weight, sustainability and affordability combined.
- Consumer products applications; e.g nature-feeling surface design of white-goods
- Composite applications looking for minimizing synthetic materials for achieving better environmental impact without suffering from high prices

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Specifications	
Fiber Content	30%
Weight	225 g/m^2
Thickness	0.25 mm
Width	up to 100 cm
Length	up to 50 m
Density	1.18 g/cm^3

Mechanical Properties*	
Tensile Modulus	9.2 ± 1 GPa
Tensile Strength	70 ± 10 MPa
Elongation at Break	1.5 – 2 %
Flexural Modulus	6.4 ± 0.5 GPa
Flexural Strength	90 ± 20 MPa

* UD laminates of 8 plies UD-Flax 30 were tested according to ISO 527 for tensile, ISO 14125 for flexural.

Processing Guidelines

- Suitable with thermoforming processes, contact or IR heater can be used.
- Recommended process temperature is 190 °C - 210 °C.
- No specific precautions in handling and during composite manufacturing is required as UD-Flax is bio-based product.
- No need for cold-chain storage as UD-Flax is a thermoplastic-based prepreg.
- Recommended storage condition is at moderate temperature, away from humidity and in their original packaging.

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Lightweight and sustainable bio-based composites at industrial scale

UD-Flax Mute

Enjoy sustainable silence

About UD-Flax Mute

UD-Flax® Mute is a laminated composite plate designed to provide a **thin & lightweight barrier for structure-borne noise**.

UD-Flax Mute provides a unique noise barrier performance and high mechanical properties as well.

UD-Flax Mute is a perfect fit for industries looking for sustainable solutions in acoustic panels and noise control systems.

UD-Flax Mute can be used as

- a layer in noise control systems
- skin (face) sheet in sandwich structures especially with PUR foams

We offer UD-Flax Mute as flat sheets in required dimensions up to 1 m^2 and a thickness of 2 – 4 mm depending on noise barrier requirements.

Key Features & Advantages

- Low eco-impact
- Manufacturable partly eco-friendly or 100% biodegradable
- High mechanical performance
- Lightweight compared to EPDM consisting noise barrier panels
- Barrier to structure-borne noise providing sound transmission loss of up to 45 dB
- Enhance mechanical & acoustic performance of foam structures

Field of Uses

UD-Flax Mute is suitable for any acoustic application requiring sustainability, weight reduction, barrier to structure-borne noise and high performance. Just to provide insight, such applications could include, but not limited to the following;

- *Marine applications:* e.g. lightweight acoustic panels for engine room cover
- *Construction applications:* e.g. noise barrier in floor coverings, walls etc. of green buildings
- *Manufacturing plants application:* e.g. in noise control systems for machine parks with high frequency sounds

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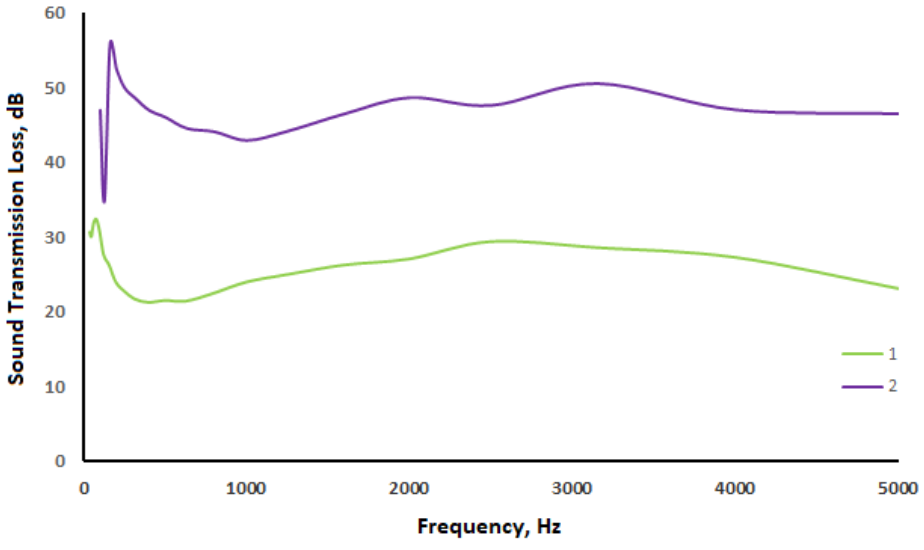
Specifications

Fiber Content	30% - 50%
Thermal Conductivity	0.08 – 0.12 W/mK*
Weight	1600 – 2400 g/m^2 *
Thickness	2 - 4 mm
Width	10 to 100 cm
Length	10 to 100 cm

* 2 mm thickness

Sound Transmission Loss Performance



Sample Details

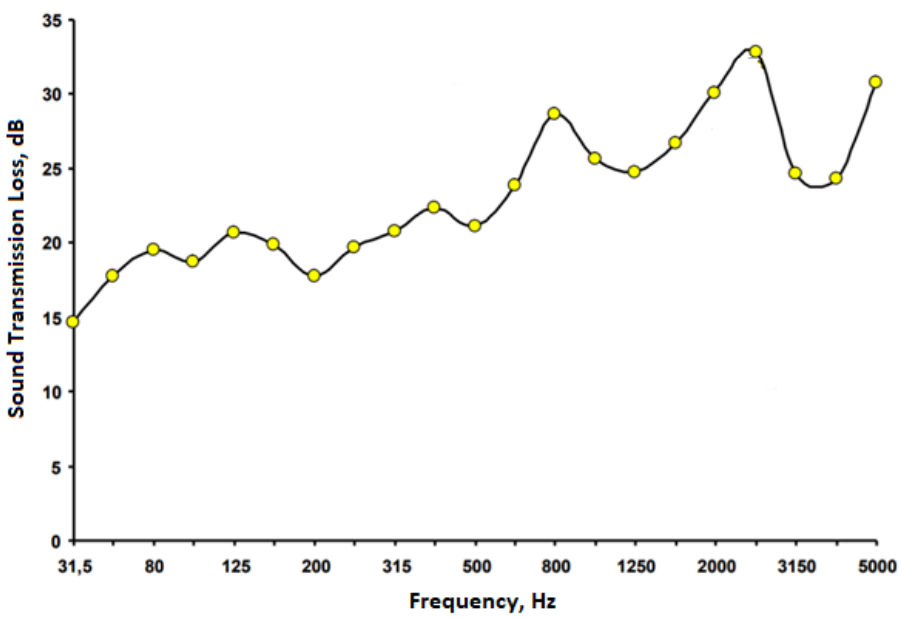
- *No 1:* 2 mm thick laminated plate of UD-Flax 30
- *No 2:* 3.5 mm laminated plate of UD-Flax 50

Method: ISO 10534-2, ASTM E1050 (Impedance Tube)
Performed at Novosim Laboratory, 2018

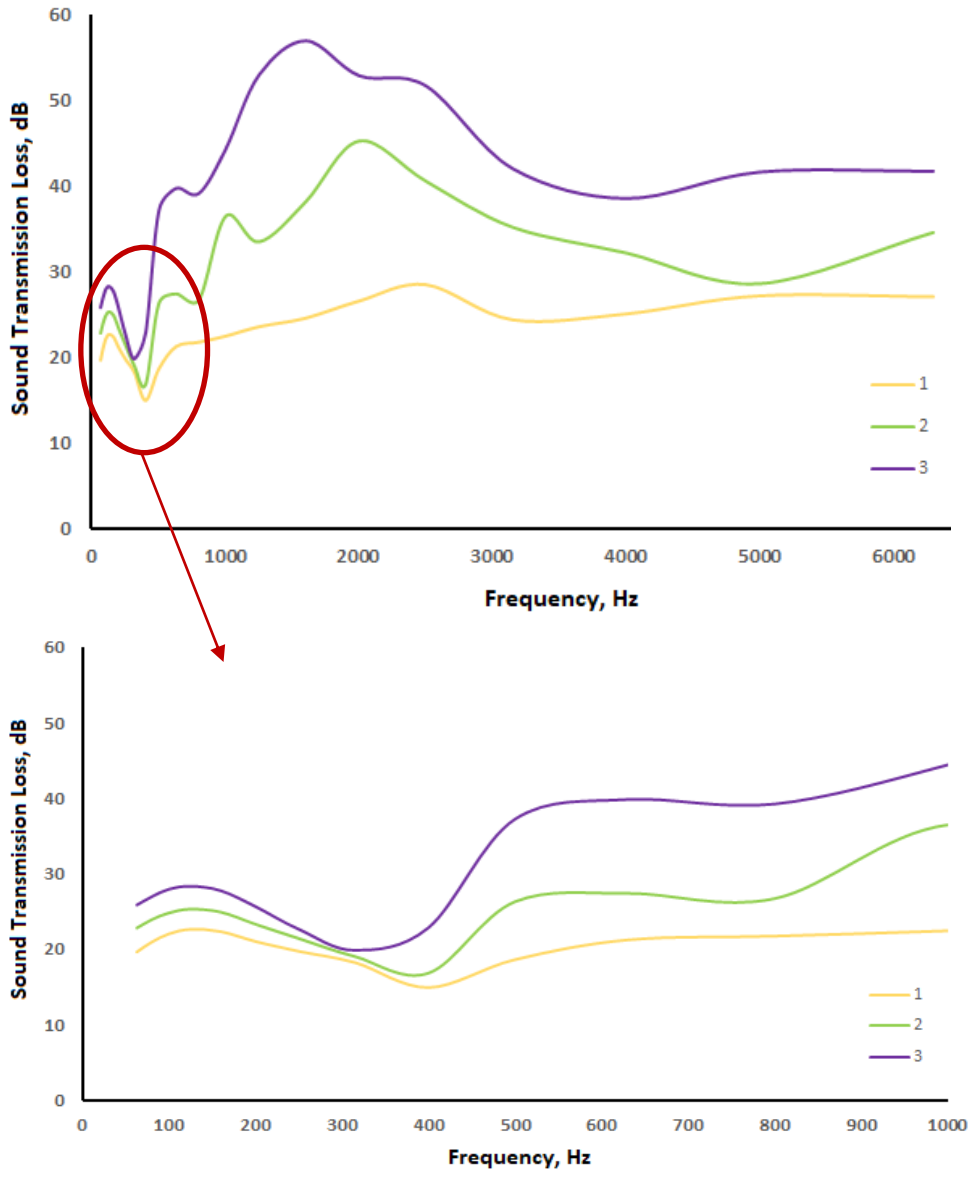
Processing Guidelines

- No specific precautions in handling and during composite manufacturing is required as UD-Flax is bio-based product.
- No need for cold-chain storage as UD-Flax is a thermoplastic based prepreg
- Recommended storage condition is at moderate temperature, away from humidity and in their original packaging.

Sound Transmission Loss Tests



Sample Details: 2 mm thick laminated plate of UD-Flax 30
Method: BS EN ISO 717-1 (Alpha Cabin)
Performed at Izmir Katip Celebi University Construction Materials Lab, 2019



Sample Details:

- *No 1:* 2 mm thick laminated plate of UD-Flax 30
- *No 2:* 4 mm thick plate (2 pieces of 2 mm thick laminated plates of UD-Flax 30 were attached by adhesive tape)
- *No 3:* 6 mm thick plate (3 pieces of 2 mm thick laminated plates of UD-Flax 30 were attached by adhesive tape)

Method: ISO 10534-2, ASTM E1050 (Impedance Tube)
Performed at Pechom Inc. Laboratory, 2020

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