



CristexCompositeMaterials

Materials supplied by





What is UHMWPE fibre?

Ultra-High Molecular Weight Polyethylene (UHMWPE) is a type of polyolefin that is composed of very long chains of polyethylene molecules with exceptionally high accuracy of parallel orientation and profound levels of crystallinity.

Due to these long overlapping chains, every molecule of UHMWPE attract each other with multiple Van Der Waals bonds, which results in fibers with great strength. Enhanced chemical properties such as low moisture absorption and inertness to other chemicals and agents can be attributed to the fact that UHMWPE molecules do not have any polar groups.

UHMWPE fibers are one of the most superior fibers compared to other fibers due to its low density whilst having the strongest physical properties.

This in turn makes superior physical properties and makes these fibers attractive for several industrial and life protection applications.

Key features

- » Ultra-high tensile strength and modulus
- » Excellent strength-to-weight ratio
- » Exceptional toughness
- » Water and moisture resistance
- » Resistance to microorganisms and most corrosive chemicals
- » UV stability
- » Resistance to fatigue and internal friction





What is UHMWPE UD sheet?

UHMWPE UD sheet is a roll product consisting of layers of unidirectional (UD) fibers cross plied in 0°/90° orientation and consolidated with matrix which is developed in-house. These materials are used in a wide range of protective and industrial applications.

Our technology covers not only solution based coating but also thin film coating to make UHMWPE UD sheets available for customer preferences.

Kordsa UHMWPE UD sheets can be tailored according to specific customer requirements and applications. Quantity of 0°/90° cross plies can be adjusted and consolidated with a unique matrix system to achieve the highest performance. Different areal weights and roll lengths are available upon customer requests.

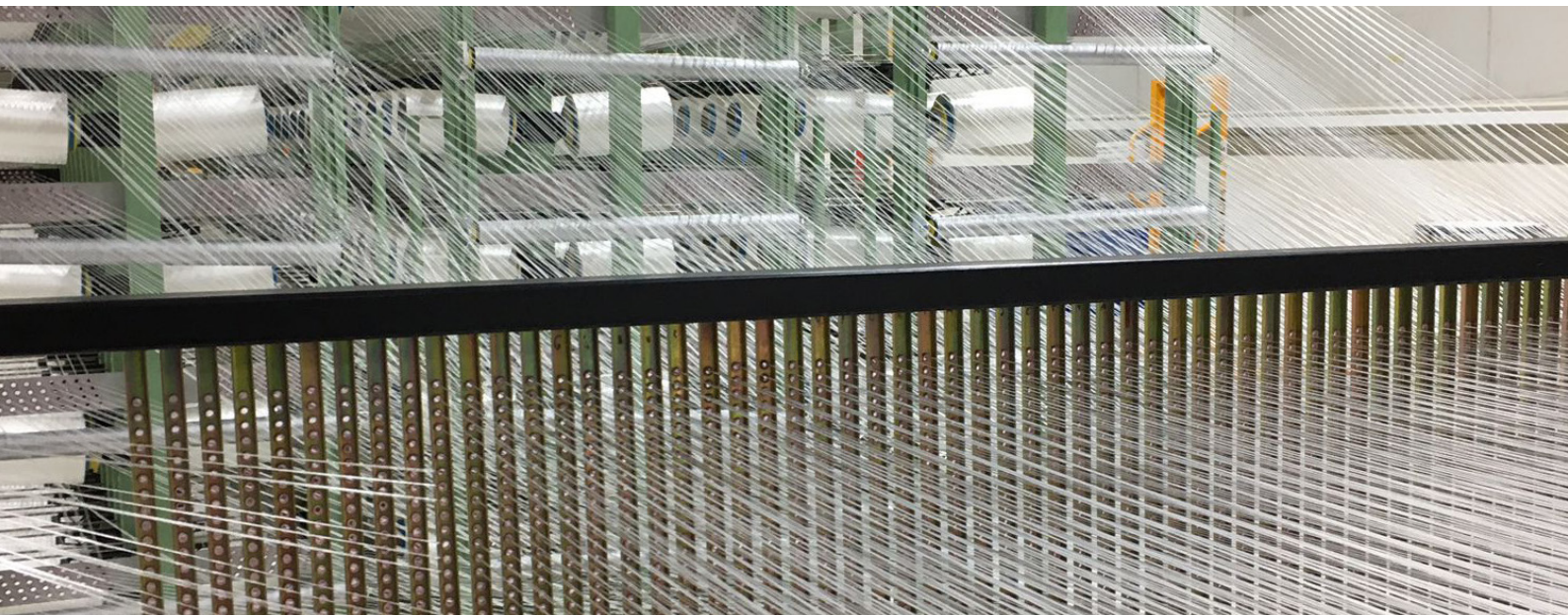
Last but not least, the products are subjected to an intensive quality control process. In-line product control, visual inspection and lot-based release tests are performed to ensure that the product quality is maintained.

Kordsa strives to reinforce life in accordance with AS9100D quality management system requirements. It creates sustainable value for its customers with UHMWPE UD sheet products, as it does with all products within its product portfolio.

Key features

- »»» Enhanced performance-to-weight ratio
- »»» Superior kinetic energy absorption than woven products
- »»» High temperature stability and rigidity
- »»» High resistance to moisture
- »»» Excellent heat resistance
- »»» Chemical Resistance

- »» **Outstanding toughness with minimal deformation**
- »» **Superior resilience with Kordsa's unique binder resin systems**
- »» **High abrasion resistance, exceptional cut resistance**
- »» **Excellent stiffness and outstanding protection**
- »» **Multi-hit capability**
- »» **Low defect rate**
- »» **Can be "tailored to fit" for specific requirements**



KEF 30 HB

Material	KEF 30 HB
Description	A roll product consisting of four layers* of UD fibres cross plied at 0°/90°/0°/90° and consolidated with matrix
Roll length	100 m **
Roll width	1.60 m
Applications	Hard protective clothing (helmet), spall liner, platform protection plates (air, naval and land vehicles) and rigid life protection plates

*Can be tailored to 2 / 4 / 6 layers according to customer demand.

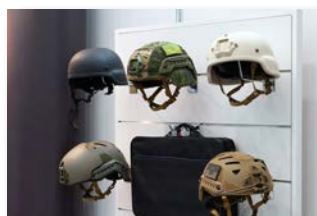


Areas where Kordsa UHMWPE UD sheet is applied?

These materials are used in a wide range of protective and industrial applications.



UHMWPE composite plates are used in life protection products, personal protective clothing and platform protection purposes



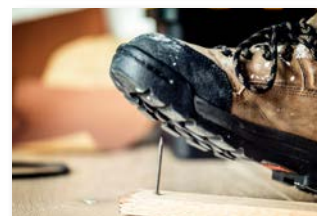
UHMWPE material is widely used in soft protective clothing (soft vest) as undergarment and concealable armour for its stab resistance and protection against secondary fragments, without compromising on comfort and mobility.



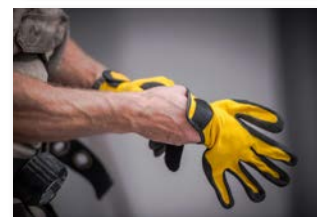
Thanks to its excellent strength-to-weight ratio, it is used in creep free and highly durable sail cloths.



The material is puncture-resistant, breathable, flexible and environmentally friendly, it is used in safety shoes, labor shoes, climbing shoes etc.



Due to the extreme abrasion resistance, UHMWPE UD sheet is also used in the production of high-strength, ultra-high-strength, super-strong, cut-resistant clothes such as insoles, sleeves, uniforms, shirts etc.



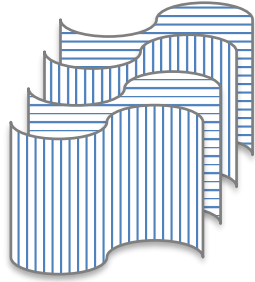
It is also used in outdoor sports equipments. UHMWPE has a very low coefficient of friction, is self-lubricating, breathable, water-proof and wind-proof. It is suitable to be used in motorcycle helmet, skiing board, skiing helmet, parachute etc.



Material shows low dielectric constant and high electromagnetic wave transmittance allowing military, civil and telecommunications organizations to realize the full potential of their advanced antenna, radar, radio astronomy or communications systems.



TECHNICAL DATA SHEET

Product Name	EF 30 HB
Description	<p>A roll product consisting of four layers* of UD fibers cross plied at 0°/90°/0°/90° and consolidated with matrix</p> 
Fiber	UHMWPE Fiber
Weave Type	Balanced Unidirectional
Prepreg Areal Weight	264 (±) 15 g/m ²
Roll length	100 m**
Roll width	1.60 m
Applications	Hard protective clothing (helmet), spill liner, platform protection plates (air, naval and land vehicles) and rigid life protection plates
Key Specification	Enhanced performance-to-weight ratio Better kinetic energy absorption than woven products High temperature stability and high rigidity
Cure Temperature	120°C - 130°C
Service Temperature (°C)	-51°C and +71°C
Storage Condition	@ Room Temperature

* can be tailored to 2 / 4 / 6 layers according to customer demand

** can be tailored according to customer demand

Process Safety & Precautions:

- All necessary precautions should be applied for the closed distance between platens so as to prevent the plate from being ejected between the platens during curing cycle.
- If it happens, it may result in serious injuries for the employees in the manufacturing area.
- In case of any further guidance is needed please call your point of contact at Kordsa.

PE Based Cross-Plied Fabric - Usage Recommendations:

The roll is delivered with its roll report. It might have some irregularities during the roll length, those are labelled as “allowance”. Under these circumstances, it is recommended not to stack irregularities on top of each other. Rather than doing that, it is highly recommended to stack the sections along with width direction (Rather than 1-2-3; it is recommended to use 3-3-3 / 2-2-2 / 1-1-1)

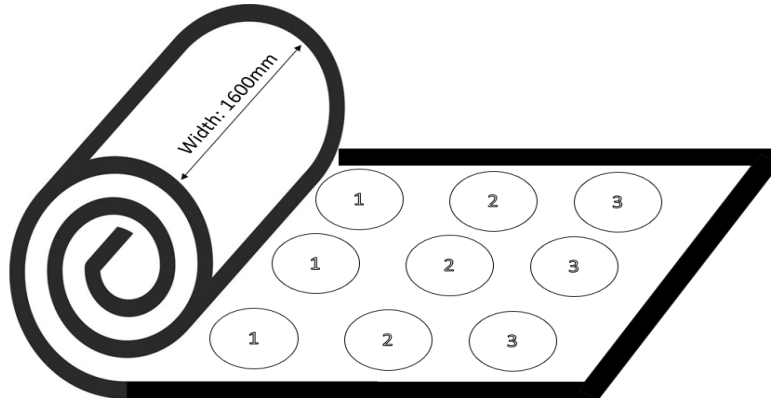


Figure 1 Visual Representation of Recommended Ply Stacks

EF 30 HB – Important Remarks:

- Polyethylene based cross-plied fabric should be stored protected from light, dust, water or other contaminants before processing.
- Polyethylene based cross-plied fabric is primarily suitable for hot pressing process.
- If it is required, polyethylene based cross-plied fabric can be processed under autoclave conditions (7 bars of pressure) that will result in less consolidation.
- The best protective performance is a matter of the balance of curing time, pressure and processing temperature.
- For the manufacture of hard protective material, it is recommended the customer should conduct trials and standardize curing conditions, considering their operating conditions and the curing process properties to be used.

- The higher the applied pressures, the better protective performance is.
- Cure cycle time is a matter of thickness. The thicker the plate the higher the cure time is. It should be adjusted accordingly.
- Controlled heating and cooling capacity of the press will have positive impact on the required protective performance.
- Make sure that the temperature reading from the core does not exceed 130 °C during the whole processes):

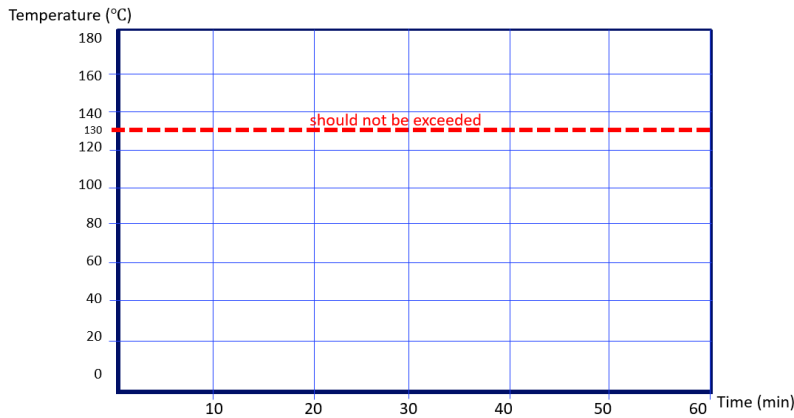


Figure 2 Upper Temperature Limit Representation

Recommended Process Steps for Press Curing of EF 30 HB:

- Preheat the molds to 60°C before loading the stacked layers
- Place a release liner onto the surface of lower platen surface (optional)
- Load the stacked material into the mold
- Put thermocouple wire in the center of the polyethylene based cross-plyed plies to track the temperature of the center of the composite layers
- Make sure to place the thermocouple is in the middle of the stacked layers. This temperature measurement is the temperature you must track
- Place a release liner on top of the stacked materials before the pressure application (optional)
- Close the press
- Apply a minimum pressure of 20 bar (2 MPa or 20 kg/cm²)
- Increase the temperature by 3°C /min
- Temperature – Duration – Pressure should be optimized by the customer
- Decrease the temperature by 3°C /min to 50°C
- Open the mold.



USAGE AND REPACKAGING
USAGE
<ol style="list-style-type: none">1. Before opening unopened rolls or plastic bags, make sure that the environment is clean.2. Cut open the plastic bag of the room-temperature roll.3. Remove the documents that came with the roll from the package during shipment.4. Take the role on the suitable bench / opener and start using it.
REPACKAGING
<ol style="list-style-type: none">1. Make sure the alignment is straight.2. Place the original shipping documents and desiccant material into the roll.3. Threat the plastic bag over the roll.4. Purge the air inside the roll (manually / preferably with a vacuum suction unit).5. Complete the packaging process by lightly melting / tying the mouth part of the plastic bag not to open.

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