

## SUSTAINABILITY CERTIFICATE

### KPM PRODUCTS;

- CREW 100
- CUTTER100
- DS100

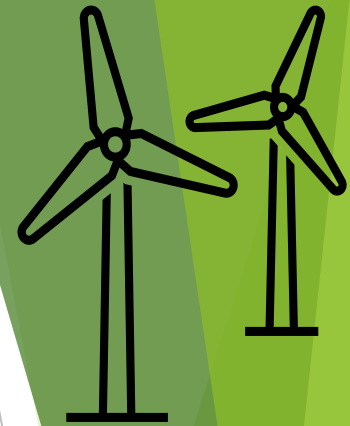


Queens Award for Enterprise  
:Innovation 2022



# KPM-MARINE

## SUSTAINABILITY CONFORMANCE CERTIFICATE



Total recycled manufacture material = 75%

Total recyclability end of life by weight = 95%

Recycling energy requirement = 3.12MJ



Longest supply chain length 1900KM (ALU)

Local content 10km radius = 80% by parts

Content <> 300 km 10 % by parts



Paint and Finish status. No VOCs or solvents

Repairability : 100%

Life duty cycle: 15years

Warranty rate 0.03% over 8000 seats



Carbon usage per seat = 58.6 kg

Energy usage per seat = 716 MJ

Air acidification per seat = 0.07 Kg SO<sub>4e</sub>

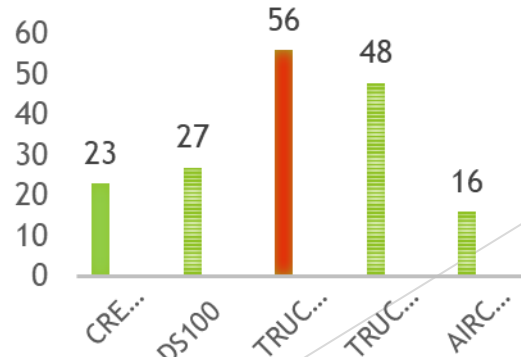
Water eutrophication per seats = 0.002 Kg PO<sub>4e</sub>



Weight saving :Golden rule

For every 10 % saved in weight there is a 7% fuel saving. KPM earth gain design protocols ensure weight is kept low to ensure low environmental and financial cost through out operation

SEAT UNIT WEIGHT COMPARISON KG PER SEAT



Lon- NY return = 6670 kg CO<sub>2</sub>



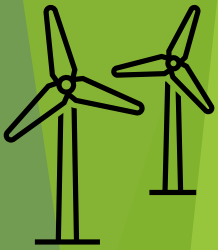
300 miles = 64 kg CO<sub>2</sub>



300 miles = 20 kg CO<sub>2</sub>

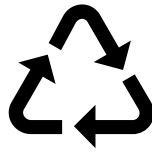
# KPM-MARINE

## SUSTAINABILITY EARTH GAIN



### KPM PRODUCTS;

- CREW 100
- CUTTER100
- DS100



Earth gain by using recycled Materials at a level of 75%

CO2 KG REDUCTION USING 75% RECYCLABLE MATERIAL

■ new matl ■ 75% recyc



ENERGY REDUCTION IN MJ USING 75% RECYCLABLE MATERIAL

■ New matl ■ 75 % REC ■ ■



AIR ACIDIFICATION IN SO2E REDUCTION USING 75% RECYCLABLE MATERIAL

■ new matl ■ 75% recyc



WATER EUTRIPICATION IN PO4E REDUCTION USING 75% RECYCLABLE MATERIAL

■ new matl ■ 75% recyc

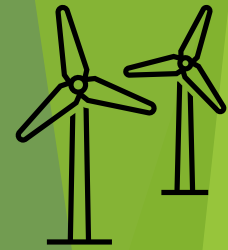


### CARBON REDUCTION BY ACTIVITY

Chain Activity	0% REC	75% REC	Earth Gain
Material	171 kg	48 kg	123kg
Manufacturing	7.62kg	7.62kg	0
Transport	0.921kg	0.921kg	0
End of life	4.564kg	1.52KG	3.044
TOTAL	200kg	58.6 kg	141.4 kg

### ENERGY REDUCTION BY ACTIVITY

Chain Activity	0% REC	75% REC	Earth Gain
Material	2512MJ	574MJ	1938
Manufacturing	124MJ	124MJ	0
Transport	15.6MJ	15.6MJ	0
End of life	3.12MJ	3.12MJ	0
TOTAL	2654MJ	716MJ	1938 MJ



### Use Region

The use region is used to determine the energy sources consumed during the product's use phase (if applicable) and the destination for the product at its end-of-life. Together with the manufacturing region, the use region is also used to estimate the environmental impacts associated with transporting the product from its manufacturing location to its use location.

### Manufacturing Region

The choice of manufacturing region determines the energy sources and technologies used in the modeled material creation and manufacturing steps of the product's life cycle

### Glossary

**Air Acidification** - Sulfur dioxide, nitrous oxides other acidic emissions to air cause an increase in the acidity of rainwater, which in turn acidifies lakes and soil. These acids can make the land and water toxic for plants and aquatic life. Acid rain can also slowly dissolve manmade building materials such as concrete. This impact is typically measured in units of either kg sulfur dioxide equivalent ( $SO_2$ ), or moles  $H^+$  equivalent.

**Carbon Footprint** - Carbon-dioxide and other gasses which result from the burning of fossil fuels accumulate in the atmosphere which in turn increases the earth's average temperature. Carbon footprint acts as a proxy for the larger impact factor referred to as Global Warming Potential (GWP). Global warming is blamed for problems like loss of glaciers, extinction of species, and more extreme weather, among others.

**Total Energy Consumed** - A measure of the non-renewable energy sources associated with the part's lifecycle in units of megajoules (MJ). This impact includes not only the electricity or fuels used during the product's lifecycle, but also the upstream energy required to obtain and process these fuels, and the embodied energy of materials which would be released if burned. Total Energy Consumed is expressed as the net calorific value of energy demand from non-renewable resources (e.g. petroleum, natural gas, etc.). Efficiencies in energy conversion (e.g. power, heat, steam, etc.) are taken into account.

**Water Eutrophication** - When an over abundance of nutrients are added to a water ecosystem, eutrophication occurs. Nitrogen and phosphorous from waste water and agricultural fertilizers causes an overabundance of algae to bloom, which then depletes the water of oxygen and results in the death of both plant and animal life. This impact is typically measured in either kg phosphate equivalent ( $PO_4$ ) or kg nitrogen (N) equivalent.

**Life Cycle Assessment (LCA)** - This is a method to quantitatively assess the environmental impact of a product throughout its entire lifecycle, from the procurement of the raw materials, through the production, distribution, use, disposal and recycling of that product.



**EARTH  
GAIN**

KPM EarthGain are 7 design protocols that facilitate the design process in ensuring all KPM products are recyclable and sustainable

- Weight
- Eliminate vocs and plastic
- Recyclability
- End of life value
- Repairability
- Localisation
- Resource availability