



Carbon steering wheels



Use and Maintenance Manual

SUMMARY

<u>1. INTRODUCTION</u>	3
1.1 Product presentation.....	3
1.2 Patents.....	4
1.3 CE certification.....	4
1.4 Contents of the box.....	5
<u>2. SAFETY NOTES</u>	5
<u>3. INSTALLING THE WHEEL</u>	6
3.1 General precautions.....	6
3.2 Fitting the wheel on a cylindrical axle.....	7
3.3 Fitting the wheel on a conical axle.....	7
3.4 Final operations.....	8
<u>4. IMPROPER USE</u>	9
<u>5. MAINTENANCE</u>	10
<u>6. DISPOSAL</u>	10
<u>7. IDENTIFYING YOUR WHEEL</u>	11
ADDRESSES.....	11
GUARANTEE.....	12

The high pressure autoclave curing of pre-preg carbon fibres guarantees the laminate is compact and waterproof. The carbon fibres are evenly coated with epoxy resin. These specific features of the laminate and the adhesive between the metal and carbon mean there is no risk of internal electrolytic corrosion.

The production process involves using internal vacuum bags, which cannot be completely removed after treatment. In rare cases, you could hear slight sounds caused by small items moving inside the wheel: they are just fragments of vacuum bags that we could not remove but they do not form any sort of structural fault or detachment of any parts of the wheel structure.

1.2 Patents

The distinguishing feature of this carbon wheel is that it is made in a single piece without any secondary bondings, with a special production process covered by **international patents in the EU and the USA**, making it a world exclusive of Exit Engineering. Any slight imperfections on the middle plane of the wheel are only on the resin surface. Structural integrity is guaranteed by the continuous fibres inside and any small surface faults do not effect the mechanical features of the wheel.

Thanks to the technology used by Exit Engineering, the use of FEM design simulators and structural engineering, an extremely lightweight product has been obtained with very low rotational inertia while fully passing the CE certification requisites.

1.3 CE Certification



The product conforms to the **CE** directives for **Small craft – Steering gear – Cable and pulley systems (EN ISO 8847:2004)**, as required by the Recreational Craft Directive 94/25/EC, updated to 2003/44/EC, as certified by the **European Certification Bureau, Netherlands**.

1.4 Contents of the box

Carbon fibre steering wheel

(The dimensions of your model are shown on the enclosed Certificate of Conformity)

Stainless steel spacer

Black polymer hub cap

Certificate of Conformity to the sample examined by the Notified Body.

2. SAFETY NOTES

This carbon fibre wheel has been designed and constructed exclusively for steering a recreational sailing boat fitted with a steering system using cables and pulleys.

The project parameters exceed those requested by the certification procedure and the built-in features of the material used create a greater stiffness than that given by standard metal wheels. This extreme stiffness could give a sense of security in using the wheel as support in the case of sharp movements by the boat.

However even if the wheel can support greater loads, the steering system as a whole is not certified to support more

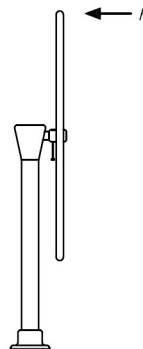


Figure 5 — Application of axial load

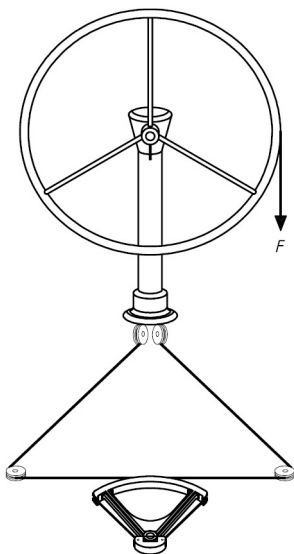


Figure 6 — Application of tangential load

than 70 kg applied at right angles to the plane of the wheel and 46 kg applied at tangentially to the rim (refer to extracts of ISO standards). A heavier load could cause dangerous breakage to any of the connected steering elements (post, cables, pins, gears, etc.). You should also remember that CE requisites for metal components establish that deformations caused by these overloads must not exceed set limits, whereas with carbon components no permanent deformation can occur before the component breaks. Should you have to apply heavier loads than those authorised, certain metal components could bend and become impractical to use (while you should still be able to steer the boat with fully certified components).

3. INSTALLING THE WHEEL

3.1 General precautions

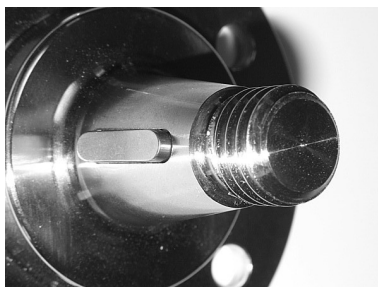
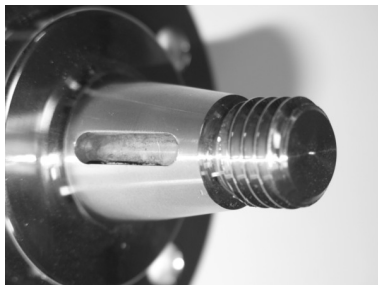
The hub is always installed according to the customer's request, depending on the axle the wheel is mounted on. Check that the hub (conical in the figure) that is installed on your wheel is the one specified in the sales invoice and that it corresponds to your requests, which were confirmed by the buying manager when the proforma invoice was accepted.

Wheels with conical hubs cannot be installed on cylindrical axles and vice versa.

Should the wheel not correspond to the type of axle you have on your boat do not try to adjust it but immediately contact Exit Engineering.

When fitting the wheel, ensure the pin is coated with a suitable protective lubricant.

Follow the instructions according to the type of axle you have on your boat, fitting the wheel with the rear facing the post or bulkhead. The rear side is the one without grooving, drops or recesses on the hub (see the figure on the previous page); it is also the side where the S/N and CE labels are attached, while the Exit Engineering logo can be seen on the front side on one of the spokes.

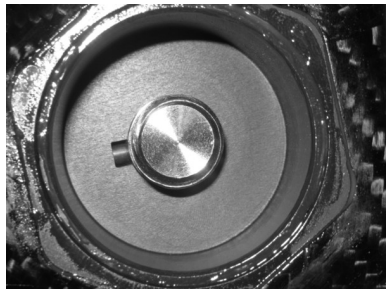
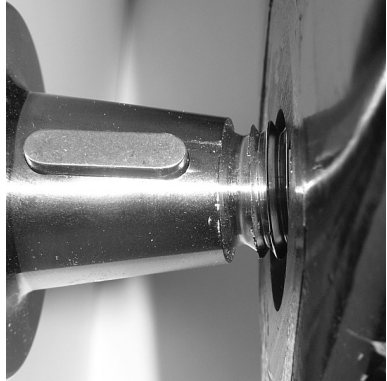


3.2 Fitting the wheel on a cylindrical axle

1) Fit the key in the axle housing.

2) Gently fit the wheel onto the axle evenly pressing it with both your hands, quite hard so that it matches perfectly with the wheel. It is important that the wheel is centred with respect to the axle when it is being pressed. If the wheel seems too hard to fit, you should remove it and begin again, paying more attention to aligning it with the axle. Do not use hammers or other tools to knock on the hub!

3) Fit the spacer and tighten the nut (both supplied by your steering system supplier).

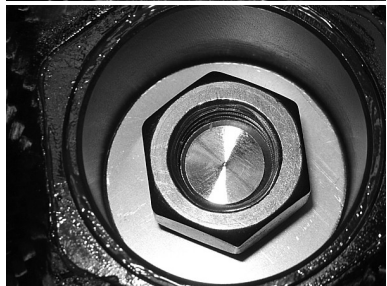


3.3 Fitting the wheel on a conical axle

1) Fit the key in the axle housing.

2) Line the wheel up with the steering axle and gently push it on.

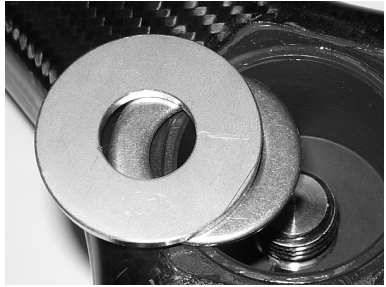
3) The wheel will not be stable until the nut is firmly tightened down. Should it be difficult to find a stable position at this stage, it DOES NOT mean there is a tolerance problem between the axle and hub angles. Carefully control the key is aligned with the housing in the hub until the nut has been tightened.



4) Fit the spacer and tighten the nut, which are supplied by your steering system supplier, until the wheel is firmly fixed on the axle.

5) If the spacer supplied by the steering system supplier is not sufficient to give a stable assembly, use the spacer supplied by Exit Engineering.

6) In rare cases you could have to use both the spacers to block the wheel in place, if so use the Exit Engineering spacer first (see the figure on the right).



3.4 Final operations



Exit Engineering supplies a black polymer hub cap that matches your wheel. To complete the installation, fit the hub cap in the central hole on the conical hubs or in the special groove on the cylindrical hubs, lining the hexagonal cap up with the metal structure of the wheel hub. Press evenly on the surface of the hub cap until it fits perfectly in place.



4. IMPROPER USE

Should the carbon fibre structure break it could create sharp edges.

Should it be broken during transport or for other reasons, do not handle the wheel and immediately contact Exit Engineering.

The wheel and its components must not be used until they are correctly installed on their axis on a boat.

Ensure that children and irresponsible people cannot reach the wheel components or the packaging (bags, boxes, metal parts, etc.) as they could be dangerous.

The wheel must only be used for the purpose it was designed i.e. steering a boat using the components of a certified steering system. For no reason it can be used for different purposes.

Do not rest the boom on the wheel.

Do not hold onto the wheel.

Check that the steering system is free to turn. Unusual stiffness in turning the wheel could mean that it has reached the end of its run, that there is an obstacle between the rudder blade and the hull, nets, seaweed or anything else is wrapped around the rudder axle, foreign bodies are between the internal components in the steering system which could block the quadrant, gears, cables, or any other causes that are not hydrodynamic.

Do not force the wheel to turn if it is stiff as you could break the steering system components or worsen the blockage. If it is hard to turn the wheel, stop the boat and find the cause and call on a qualified person to help if needed.

5. MAINTENANCE

Carbon fibre epoxy structures are not prone to osmosis nor other kinds of chemical degradation so they do not require any special maintenance. Nevertheless, we advise against the use of detergents, since under the effect of sunlight they can become aggressive against paints. Our advice is to wash the product with water.

The materials and technology used in its production guarantee excellent long life thanks to the structural properties of the resin and excellent resistance to weather and UV radiation of the paints that Exit Engineering uses. However these special features could make it difficult to find any operators who are sufficiently qualified to make any repairs further to wear or accident that can restore the wheel in its original state. Therefore Exit Engineering offers a special overhauling service for all its products. Please consult the Exit Engineering website or contact our head office for details of our service.

6. DISPOSAL

This product does not constitute harmful refuse under the terms of EEC directive 91/687/EEC.

The materials used in its manufacture cannot be recycled with the normal plastic materials, but require special procedures sometimes used for composite structures, such as fibreglass boat hulls.

These procedures are not always available and therefore it should be disposed of as dry not-recyclable refuse.

The user is responsible for ensuring that it is sent to the appropriate refuse centre at the end of its life to prevent the sanctions being applied under the terms of refuse disposal legislation.

Correct separate refuse collection to ensure that the product is forwarded for treatment and disposal that is environmentally compatible helps to prevent any negative effects on our environment and health.

7. IDENTIFYING YOUR WHEEL

Your wheel is clearly identified by a Serial Number (S/N) of eleven figures, which can be seen with the Structure Product Number (SP/N) near the hub on a white plate next to the CE mark. The version of the model corresponds to the Product Number (P/N) shown on your purchase invoice. All the codes are also given in the Certificate of Conformity issued by Exit Engineering together with the wheel.

Exit Engineering reserves the right to make any changes at its own discretion that could be required by legislative, industrial, commercial or design reasons.

We are fully committed to constantly improving our products and are delighted to receive any observations or suggestions from you, which will be seriously considered and evaluated.

ADDRESSES

Registered office

Exit Engineering srl
via M.M.Boiardo,2
35125 Padova (Italy)

Operational office

Exit Engineering srl
via Industria 43
30010 Camponogara – Venice (Italy)
Partita Iva IT 03880600287

Tel +39 041 89 48 038
Fax +39 041 89 48 034
E-mail info@exitengineering.com
www.exitengineering.com

GUARANTEE

This product is guaranteed for 24 months from the date of purchase, proved by a valid fiscal receipt. The Serial Number (S/N) and the Structure Product Number (SP/N) should always be given which are on the back of the hub and on the Conformity Certificate.

The guarantee covers free repairs or replacement of any products or parts that are due to faulty construction. The guarantee does not cover shipment costs, which are the customer's responsibility.

If the fault cannot be repaired, Exit Engineering will use its unquestionable judgement to decide whether to replace the product, and the guarantee will remain valid until the end of the original contract. Any returned replaced parts will become the property of Exit Engineering.

This guarantee does not cover negligence or incorrect use (failure to observe the instructions given herein), incorrect installation or maintenance, maintenance carried out by unauthorised persons, damage caused by transport or any other circumstances that do not depend on the product design or manufacture.

The guarantee does not cover any sort of improper use of the product.

Exit Engineering declines any direct or indirect responsibility for any damage or injury to property, people and animals that may be caused by failure to observe the instructions given herein.

THE WHEEL DESCRIBED IN THIS MANUAL WAS MADE IN ITALY