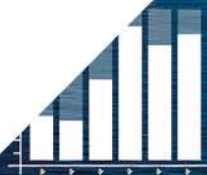




ENDURO
softslings



SF



MBR / MBD

WEDNESDAY 13°C

14:23:42

START 4:13 AM

FINISH 10:51 PM

Progress bar showing 100% completion.

EWL

Category	Value
1	1.0
2	1.5
3	2.0
4	2.5
5	3.0
6	3.5
7	4.0
8	4.5
9	5.0
10	5.5



WLL



CGBL

User instructions for **HMPE Softslings**

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1. Introduction

Read these instructions before use and make sure that the content is known and understood by every person involved in the usage of Enduro Softslings.

At all times the user is responsible to use the products in a correct manner (as described in this document) and to avoid circumstances that could involve any risk. Not complying to these instructions can lead to dangerous and especially to life threatening situations. In this case the manufacturer cannot be held responsible. Please note that Enduro Softslings can be used with engineered lifts only, meaning there is a lift plan which is made by professionals.

1.1 Used Abbreviations

CL	Circumference length
D/d	Hardware diameter / sling diameter
DNV	Det Norske Veritas
ESS	Enduro Softslings
EWL	Effective Working Length
HMPE	High Modulus Polyethylene
MBD	Minimum Bending Diameter
MBL	Minimum Breaking Load
PES	Polyester
PL	Proof load
PU	Polyurethane
SF	Safety Factor
t	Ton = 1000 kilogram weight
UV	Ultraviolet
WLL	Work Load Limit

Enduro Softslings are manufactured according to the Machine Directive 2006/42/EG.

The standard Safety Factor on the Working Load Limit is 7-1.

For example: when a 100 ton Enduro Softsling is needed for a specific lift with SF 7 the MBL will be 700 tons and the WLL will be 100 tons. This info is printed on the label of the sling and is also stated in the corresponding certificates. Please be aware that besides the standard 7 other safety factors can occur and take the MBL rating on the label into account.

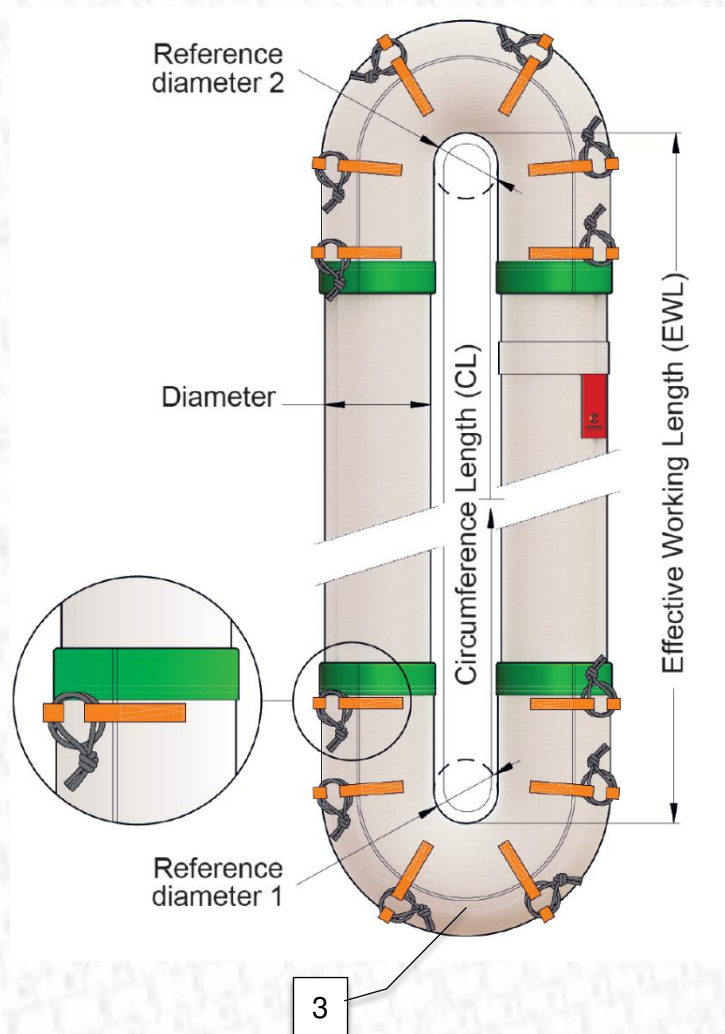
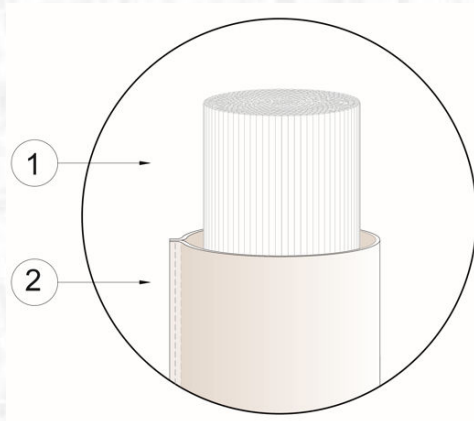
In case only the MBL is mentioned, the WLL can be calculated by dividing the MBL by the SF.

Usage of a lower SF than 7 is at own risk and should only be performed on a calculated (by qualified engineers) and approved lifting plan.

2. General information

Enduro Softslings are endless parallel laid slings and consists of three parts, the main components are:

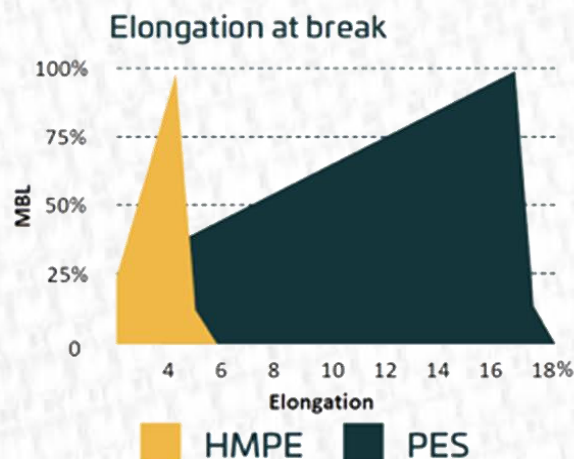
1. Core yarns
2. Cover
3. Wearpads (optional)



2.1 Core yarns

The core yarns are responsible for the strength and the stretch of the sling. Enduro Softslings are made out of 100% HMPE core yarns and has the following characteristics:

- Extremely strong and resistant to cuts and wear.
- Easy to handle due to extreme low weight/capacity ratio:
 - Up to 40% lighter than polyester slings.
 - Up to 85% lighter than steel slings or chains.
- Very suitable for subsea use:
 - Weightless in water (HMPE has a density of 0.97 g/cm³).
 - Almost no absorption.
- Large temperature range (-40°C till +60°C).
- Inert to most chemicals and UV-influence.
- At a safety factor of 7 (= standard) a HMPE sling stretches approximately 0.5% when loaded and 3% stretch at breaking point. As a result, the sling elongates less and therefore does not slide as much over the object being hoisted. See graph for comparison to polyester (PES).



2.2 Sling cover

The cover of a Enduro Softsling protects the core (yarns) from damage, abrasion, and debris. The cover is available in multiple options:

- **1.3mm normal duty HMPE cover.**

This cover is finely woven and extremely flexible. Commonly used on slings of lower capacity up to 1000t MBL. Higher capacity slings can be equipped with this cover if application demands a fine flexible cover.

- **2.4mm Heavy duty HMPE cover.**

Best protection of the core, suitable for continuous use and offshore type of work-environment, extremely abrasion resistant. This type of cover has a coarser weave and double thickness. The use of this cover type stiffens the sling and extends durability.

- **Polyester (PES) cover.**

2,5mm thick Medium Duty Polyester (PES). Coated with polyurethane (PU)

A very tough cover, but more sensitive to wear than HMPE. Suitable for normal use and very cost efficient. In High visibility NEON yellow for a safe operation.

This cover is more heavy than HMPE and affects the buoyancy characteristics of the sling. (This cover may be compared to Cordura which is a cover alternative in the sling market).

- **Wear Indicator**

On request Enduro Softslings can be equipped with a wear indicator, this is an orange or red colored liner between the core yarns and outer cover. Once the cover is damaged the bright colored liner will appear indicating that there is damage and the sling needs inspection and repair.

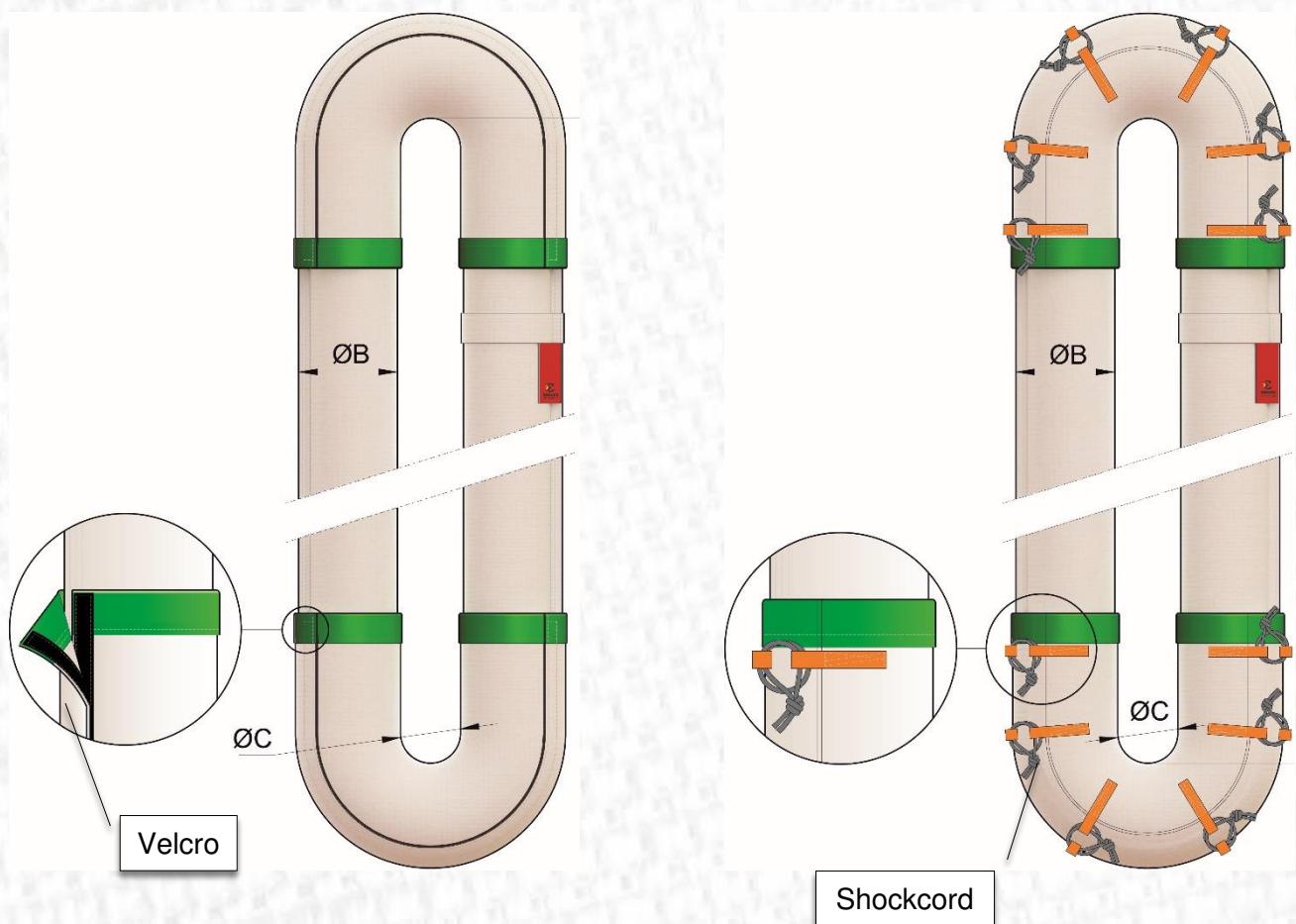
- **Anti-twist marker**

On request Enduro Softslings can be equipped with an anti-twist marker, which is a colored line or striping on the outside of the cover that showing alignment to avoid twists.

2.3 Wearpads

Wearpads are used in the loops of a Enduro Softsling at the load bearing point, they give the Enduro Softsling extra protection and support at the most demanding point of the sling. We recommend to use these wearpads at all times to extend the lifespan of your Enduro Softslings even further.

Enduro Wearpads are made out of 2,4mm thick 100% HMPE fiber with a Velcro or shockcord fastener. These fasteners can be easily installed or replaced, Note: place them on your spare parts list.





3. General instructions for the usage of Enduro Softslings

- Only use Enduro Softslings for the lifting of loads.
- Never exceed the mentioned WLL and make sure that the correct safety factor is used.
- Avoid placing the load directly on top of the sling/ID-tag.
- Avoid sharp corners, use extra protection in the form of wearpads at sharp edges/angles.
- Snatch or shock loading should be avoided as this will increase the force on the sling.
- Knotting or twisting the sling is not allowed in any case.
- Damage to the label and joint in the cover should be avoided by keeping them away from the load and hook.
- Avoid any movement of the load in the sling when lifting.
- Enduro Softslings can be used between -40°C and +60°C.
 - Prevent ice formation on or in the sling at temperatures below 0°C.
- Never use Enduro Softslings near welding, flame cutting or grinding.
 - Sparks and molten metal can damage the sling.
- Avoid heat sources exceeding the maximum working temperature range of 60°C.
- Avoid dragging slings out from underneath loads.
- It is forbidden to go below the minimum bending diameter (MBD) for Enduro Softslings. This is because the bending diameter of the sling plays a crucial role in preventing extreme contact pressure on the yarns. The MBD is also stated in the corresponding certificate of the sling. If it is necessary to go below the MBD ask your supplier for advice.

➤ 4. Specifications for Enduro Softslings





WLL. (tons)	Safety Factor	MBL (tons)	Core diameter (mm)	MBD (mm)	Weight per meter (kg)
10	7	70	34	47	1,5
50	7	350	75	105	4
100	7	700	106	166	7,5
200	7	1400	150	255	13,5
300	7	2100	184	319	19
400	7	2800	212	395	25,5
500	7	3500	237	441	32

➤ 5. Storage

- Avoid exposure to direct sunlight or UV-light.
- Enduro Softslings can be cleaned using water and mild detergent.
- Enduro Softslings are resistant to most alkalis but may be damaged by some acids, in case of any questions please contact your supplier.
- Do not place near open fire, welding work, exhaust gases, chemical fumes, boilers, radiators, steam pipes or any other heat sources.
- Let Enduro Softslings dry naturally before storing.

➤ 6. Sling Hitches

There are multiple forms of Hitching possible. In the diagram below are the most common types displayed. The standard WLL for Enduro Softslings is applicable when a straight lift is performed. When other forms of lifting are being used the standard WLL changes.

Type	Straight Lift	Basket Hitch 1	Basket Hitch 2	Choked Lift
WLL	100%	200%	45°=140% 60°=100%	X* (see remarks)
				

- Choke lifting is not recommended for Enduro Softslings. In case choking is unavoidable, always use a steel choking device at the point of contact, ask your supplier for advice.
- It is very important that the minimum bending diameter is never exceeded. This is due to possible overheating.

➤ 7. Hoisting and Rigging Hazards

It is important that riggers involved with working with Enduro Softslings are trained in both safety and operating procedures. Riggers must be familiar with the proper inspection and use of slings.

Enduro Softslings should be operated only by trained personnel. A safe rigging operation requires the rigger to know:

- The weight of the load and rigging hardware.
- The capacity of the hoisting device(s).
- The working load limit of the Enduro Softslings.

This information is printed on the label of the sling, and is also stated on the corresponding certification.

If the Working Load Limit (WLL) is not known, don't assume. Know the working load limits of the equipment being used. Never exceed these limits. When in doubt consult your engineering dept. or manufacturer. When only a Minimum Breaking Load (MBL) is stated (for engineered lifts) consult your engineering dept. or manufacturer.

Riggers must be aware of elements that can affect hoisting safety, factors that reduce capacity, safe practices in rigging, lifting, and landing loads.

Weather conditions

When the visibility is low by snow, fog, rain, darkness, or dust, extra caution must be exercised. For example, operate in "all slow" and if necessary, the lift should be postponed. Enduro Softslings manufactures slings with high visibility stripes or markers. Be aware that at sub-freezing temperatures, loads are likely to be frozen to the ground or on structure they are resting on. Avoid shock-loading at any time.

➤ 8. Frequent and Periodic Inspection for Enduro Softslings

It is essential to have a well-planned program of regular inspection carried out by a competent inspector. All Enduro Softslings that are in continuous service should be checked daily during normal operation before and after each use to ensure their safety. This should be inspected by the person who is working with the equipment. Enduro Softslings also recommends to keep a logbook of each sling.

8.1 Points for frequent inspection

- The identification label needs to be present and readable at all times.
- The cover of the sling is intact and is not subjected to any severe cutting/chafing marks.
- If the core yarns are exposed, the sling must be taken out of service immediately.
- Cross or longitudinal cuts in the cover, or any damage to the stitching, raise serious doubts as to the integrity of the core in this case contact your supplier for advice.
- Don't use in case of excessive abrasion due to an earlier overload or by an exceeded MBD
- The production date of the sling must not be older than 10 years.

8.2 Points for periodic inspection

A complete and more thorough inspection of all Enduro Softslings must be made at least once a year and preferably after each project. These periodic inspections consists of:

- All points mentioned above for frequent inspection.
- Presence and validity of the certificate.
- Written reports of conclusions, with the approval of the inspectors. This can only be done by Enduro Softslings service technicians or persons who are certified by Enduro Softslings

8.3 Recertification and repairs

Enduro Softslings carries out inspections and repairs at their head office and on site/on board. Major repairs are usually carried out at Enduro Softslings head office. Minor repairs or emergency repairs can be done on site/onboard.

Repairs and yearly inspection/recertification can also only be done by Enduro Softslings service technicians or persons who are certified by Enduro Softslings

➤ 9. Discard criteria examples

In the following situations: always contact your supplier!

Cover is damaged by wear



Yarn is visible



Cover is damaged by cuts



Cover is damaged by open seam



➤ 10. Special instructions for Enduro Softslings

Below mentioned instructions are especially intended for the usage of all slings made by Enduro. Enduro Softslings allow only minimal stretch and are therefore very sensitive to any shock load.

It is crucial that every lifting operation is planned with care to avoid any (free) fall of the load. Enduro Softslings made of synthetic fibers are vulnerable and sensitive to damages.

1. Before or during lifting consideration should be given that:
 - The load is stable and in balance by executing a test lift.
 - Slowly increase the lifting force used at the moment of lifting, and all lifting hardware is positioned correctly in the direction of the force applied.
 - The load should be secured by the sling(s) in such a manner it can't topple or fall out of the sling(s) during the lift.
2. Hardware used for Enduro Softslings must be compatible with the applied WLL. In case of any doubts regarding the compatibility, contact your supplier.
3. At least once a year the slings must be checked and examined by a competent inspector. Repairs on Enduro Softslings are only allowed to be carried out by the manufacturer. Never attempt to carry out repairs to the sling yourself.
4. Service life of Enduro Softslings:
 - In compliance with the Machine Directive 2006/42/EG, the maximum service life of the product is 10 years after date of production.
 - In case a SF of less than 7 is chosen by a user, the service life will be reduced to maximum 5 years. After the expiration date, this lifespan can be extended only by the manufacturer, after full inspection, with 1 year at the time and with a maximum of 10 years after production date.

Disclaimer:

**Any deviation from this instructions described or usage by incompetent employees can lead to dangerous and even life threatening situations.
In this case the manufacturer cannot be held responsible !**



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