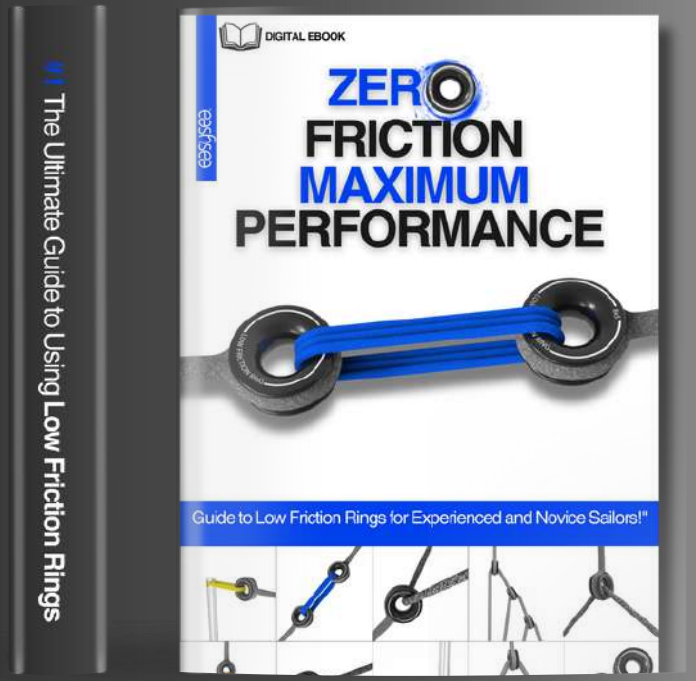
# Low Friction Ring

A guide by easysea®



# INDEX



**LET'S GET CRACKING!**

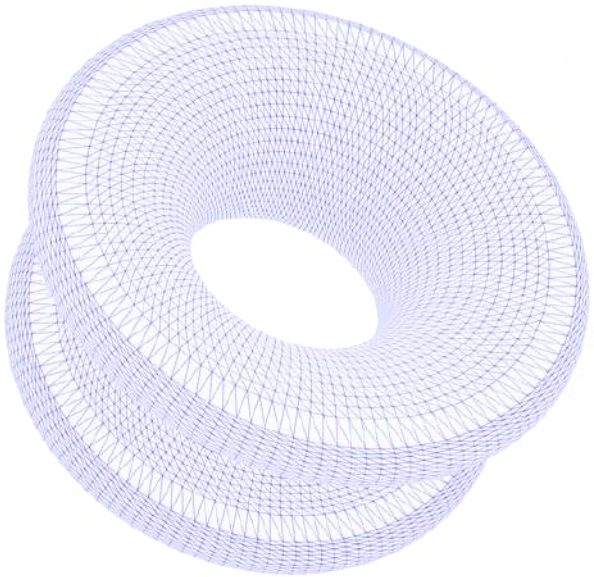
# Low friction ring: introduction

## What is a low friction ring?

Fundamentally, a low friction ring stands as a meticulously polished **circular thimble**, representing a **transformative innovation** in the realm of yacht running rigging adjustments. It serves as a compelling alternative to the conventional plain bearing block.

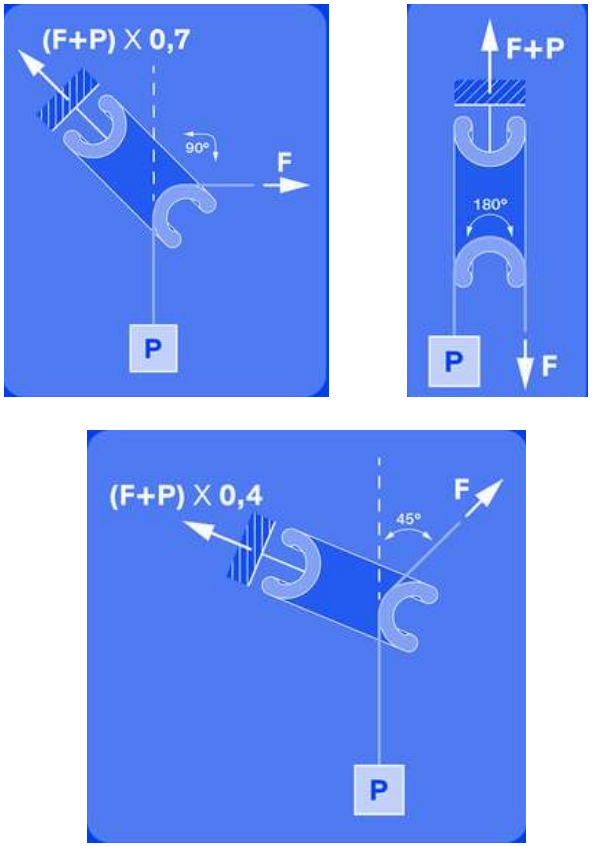
Encircling its exterior, one observes a **rounded groove**, akin to the familiar configuration found in traditional sheaves. However, the distinguishing feature of a low-friction ring resides in its **central aperture**, artfully rounded in all dimensions to **facilitate the seamless passage of lines**.

This design ensures that line, or multiple lines, glide through with **utmost fluidity**. Conversely, the exterior groove assumes a different role, primarily acting as a means to affix the ring to the terminus of another length of line, **forming a secure loop**. This innovative integration of form and function has significantly advanced the efficiency of yacht running rigging operations.



## Design and Manufacture

The design of this component is characterized by its **minimalistic approach**, devoid of **any moving parts**, and boasts a substantial inner radius that ensures a smooth and low friction passage through the eye. Externally, it features a dedicated slot designed for the attachment of ropes or shock cords to various points on the deck, mast, or other fixtures.




## Why is this ring so useful?

Low friction rings are **indispensable** on sailing boats for their ability to **reduce friction, simplify rigging,** and **improve sail control**. They are **versatile**, **durable**, and require **less maintenance** than traditional systems, making them valuable tools for optimizing sailing performance and safety.

## How can I use the ring?

Wherever a line needs to be re-routed under static load, you can use a low friction ring, such as **barber haulers**, **boom bangs**, **lazy jacks**, **backstay cascades**, **mast base tidies**, **emergency blocks**, **toe rail blocks**, and more.

# Low friction ring's history

It derives from the original term 'block.'

Low friction rings have a history dating back thousands of years, in the form of the traditional **lignum vitae wooden single deadeye**. These were essentially **solid pieces of super-dense wood**, so dense that they didn't even float. Originally, they had a **hole in the middle**, and a line went through it, as shown in the pictures.

One day, an Italian manufacturer of sailing products had an idea: 'Why don't we create an aluminum version of these blocks?' And there it was—an **anodized aluminum ring** with a gentle curve, a simple friction ring. They opted for aluminum because it's lighter than stainless steel.

# Traditional block versus low friction ring

These blocks excel in situations where the ropes they accommodate experience significant stress-induced movement over several meters. They are significantly more expensive and heavier, even with the same breaking load.

**Blocks excel in responding to dynamic loads**, but they require more space, and the use of friction-resistant materials in their manufacturing is essential.

Low friction rings, on the other hand, are **small**, **inexpensive**, and have **high breaking loads.** They are perfect for passages where ropes are put under tension over short distances. Additionally, they exhibit a **low coefficient of friction** and **high mechanical strength.**

Let's consider, for example, the flying shrouds in the lower part of the Dyneema. It's preferable to use a low friction ring because it's **lightweight and poses minimal danger**, especially when it is often positioned at face or upper chest height.

Low friction rings are ideal for **barber sheets**, **gennakers**, **spinnakers**, passing the pole arm amidships, gennaker tack or downhaul, and for returning the furling line to the winch.

**These are two winning objects that can be alternated depending on their use, optimizing cost and weight.**

VS

# Characteristics

## Cheap

A low friction ring serves as a simpler and lighter alternative to a plain bearing block. It is an exceptionally cost-effective product, significantly cheaper than a block. With no moving parts, it is easier to install and use. Its simplicity not only reduces the cost but also eliminates the need for maintenance. Additionally, it is easy to manufacture. In many typical situations on board, a much more affordable solution can be achieved using a low friction ring.

## Small

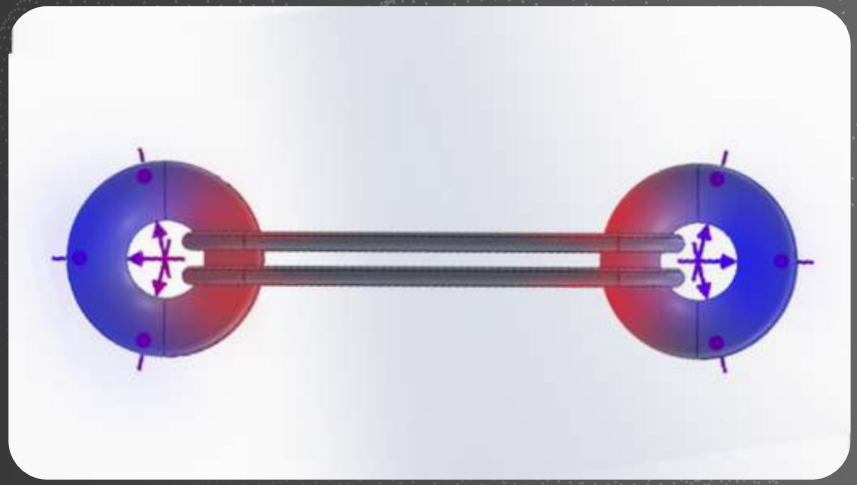
Low friction rings come in **small sizes**, ranging from a few millimeters to tenths of a millimeters. The load they can withstand varies with their size but, for the same load, a ring outperforms a block, making it a space-saving choice. Rings excel in applications where a line experiences minimal movement, such as static or semi-static settings.

## Lightweight and tough

Thanks to their materials and dimensions, low friction rings are **exceptionally lightweight**. With the growing adoption of very low friction, high modulus rope fibers like Spectra and Dyneema, an increasing number of boats are transitioning from blocks with moving parts to the simplicity of low friction rings. Their straightforward design also leads to significant weight savings.

## Safety

With classical blocks, there is a risk of overloading them and causing them to fail catastrophically. Such incidents do occur, but with this solution, it's highly unlikely. The primary reason is the strength of the rope and the line, which encompasses the entire structure and is securely contained. This design makes it exceptionally effective at handling high loads, making it an ideal choice for such applications. In situations involving high loads, these components may deform but are far less likely to fail catastrophically.



# Limitations

The main limitation of the low friction ring **pertains to materials**. Aluminum and stainless steel (inox) can potentially cause **damage to the boat**.

On the other hand, these products are absolutely awesome at deflecting energy, but one issue they're going to face is, of course, friction.

## Where is it recommended not to use them?

Low friction rings are primarily used in setups where they deflect the line's path rather than make sharp turns. It would not recommend using them for applications requiring turns greater than 60 degrees, depending on the load and specific application. The suitability depends on the boat's size and the force passing through the ring, but generally, they are not the best choice for highly loaded areas that require fine adjustments and extreme angles of deflection.

## Noise and scratches

Principal issue is the 'tik-tok' noise they produce with each wave impact, as they repeatedly fall due to the lack of tension in the line, causing unpleasant sounds.
These rings are typically constructed from materials such as aluminum or stainless steel. While they provide reduced friction and smoother operation, they can generate not only noise but also scratches on the boat's surface.
As a result, many boat owners find it necessary to attach protective patches made of nylon or carbon fiber to their vessel's deck.

In summary, while low friction rings offer **numerous advantages** in terms of reduced friction, smoother operation, and improved sail control, sailors should carefully consider the disadvantages associated with their materials. Choosing the right material for low friction rings depends on factors like the type of sailing, boat size, budget, and the sailor's environmental considerations.

In the realm of marine engineering and boat performance optimization, what we truly require is an **innovative** low friction ring **crafted from advanced materials** designed to safeguard our vessels while simultaneously enhancing their overall performance.

# THE SOLUTION

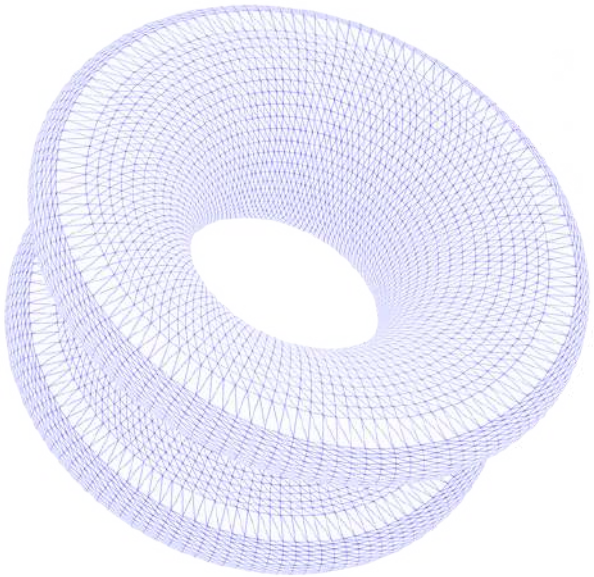
## Introducing a revolution in the world of low friction rings

At **easysea®**, we have a solution for every problem related to the world of sailing, and if we don't have one yet, we are actively working on it.

We've gathered feedback from thousands of sailors worldwide, and the outcome has been remarkable.
Among those who use Low Friction Rings (LFR), over 90% report that they are harmful to their vessel's deck.

Our mission is to create a world where **technology harmonizes with tradition**, where **sailors' concerns are heard,** and practical solutions are implemented.

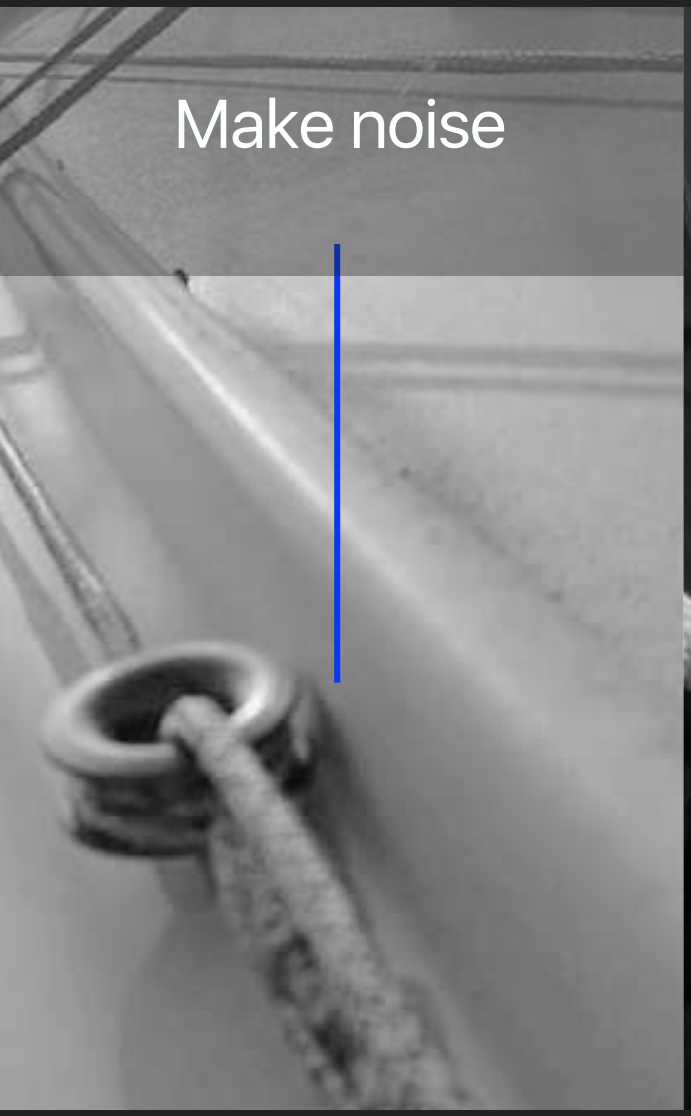
For this reason, we've worked tirelessly to develop and create a **product that will revolutionize the world of Low Friction Rings forever.**



# Introducing Olli™

The Low Friction Ring by easysea®

# OTHER LOW FRICTION RINGS






easysea

# Olli™

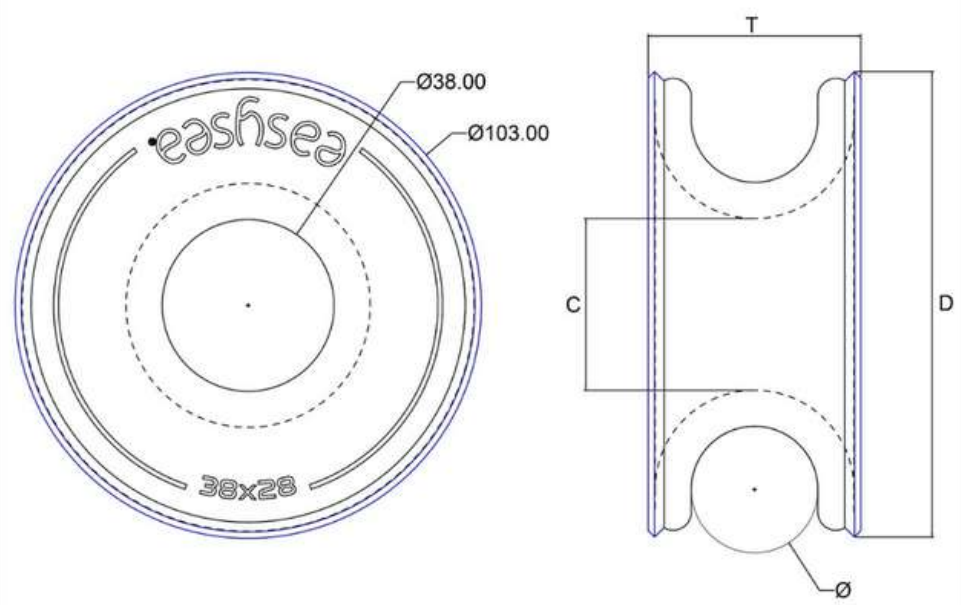
The Olli™ is the world's **first anti-shock Low Friction Ring** to protect the boat deck from signs of wear.
The Olli™ also avoid annoying noise coming from wind vibration.

## 360°
## Anti-shock - Anti-noise - Anti-scratch

# THE INNOVATION THAT WAS MISSING TO MAKE A LOW FRICTION RING COMPLETE

Olli™ is **made in Italy** built in **billet alluminium** by CNC machine providing a blend of finish quality, engineering robustness

The Olli™ **anti-corrosion surface treatment** is marine grade anodizing and provided of **double rubber protective sheath** so fully resistant to the marine environment




OlliTM incorporates a **groundbreaking anti-shock design** that efficiently absorbs shocks and **safeguards the boat's deck** against sheet and halyard-induced abrasion

# Performances

Smooth performance is **highly satisfactory**, especially **under high loads.**

**Low friction rings are recommended for maneuvers involving high loads and limited excursion movements.**
They may not be the optimal choice for maneuvers requiring continuous adjustments or extensive range of motion (e.g., mainsheets or spinnaker sheets).

## Low Friction Ring Performances

- CORROSION RESISTANCE
- VERSATILITY
- FUNCTIONAL AND EYE-CATCHING DESIGN
- MINIMAL WEAR
- COMPACT & LIGHTWEIGHT
- LOW FRICTION
- DURABLE
- LOW MAINTENANCE

# Applications

**Despite having some friction, low friction rings are a great choice in some types of applications.**

## Small Line Deflection

A deflection occurs when a line passing through a block changes its angle. As the degree of deflection increases, so does the friction. Significant line deflection is suitable for blocks with moving parts. Lesser line deflection results in less friction, making it ideal for low-friction rings. Possible applications include furling lines, components of a lazy jack system, foreguy, and afterguy.

## Static And Slightly Dynamic Lines

Low-friction rings may not be suitable for dynamic situations, such as deflection and changing line loads in a mainsheet.
Such tasks require constant adjustments and are better suited to blocks with moving parts. **Rings can be employed** in other applications that involve varying degrees of line deflection but **don't demand dynamic adjustments. Simply set them and forget them.** This is where our upper vang block comes into play.

## Mast Base Blocks

As is often the case, especially with older boats, the base of the mast can become crowded with blocks. It's possible to **replace** some of the lesser-used ones with rings, which is a great way to free up some **extra space**. For example, if the genoa is on a furler that only raises and lowers it at the start and end of the season, **it might be a good candidate for a low-friction ring.**

## Lazy Jacks

Opting for small rings alongside slender lazy jack lines reduces sail wear, in contrast to employing smaller, pricier blocks. When the lines pass through the rings, the system becomes **lighter**, and it **minimizes disruptions** to the airflow over the sail's surface.

## In and out-Haulers

Within the sailing community, rings find widespread use, particularly in systems like barber haulers, designed for precise adjustments to headsail sheet positioning. Traditionally, a genoa sheet is directed toward an adjustable genoa car positioned on a track.

Yet, nearer to the clew, there exists an alternative route for the sheet through a low-friction ring. This ring can be controlled from the cockpit and is employed to draw the headsail's clew closer to the boat's centerline, effectively reducing the gap between the headsail and the mainsail.

## Mainsail Reefing

The leech reef line forms a sharp angle as it passes through the leech reef ring in the sail. Consequently, when you reef the sail, the folded part of the sail can become compressed between the unreefed portion and the reef line. This compression not only makes reefing more challenging but can also lead to wear and tear on the sail fabric.

To address this issue, a **solution** is to **attach low-friction rings** to the leech reef ring using 3mm Dyneema line, ensuring there is approximately 6 inches of space between the reef ring and the low-friction ring. With this setup, the leech reef line passes through the low-friction ring, creating enough separation so that the reefed part of the sail isn't excessively compressed. The low-friction ring has a **smoother surface** and a **wider turning radius** compared to the reef ring, making the reefing process somewhat **easier** and **reducing the risk of sail chafing.**

Below is a table displaying various **ring applications**, illustrated with renderings created by easysea.

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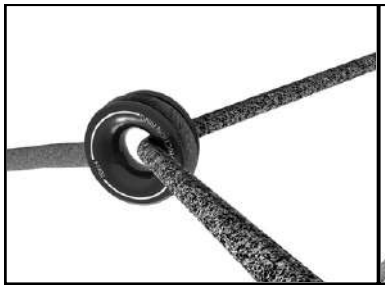
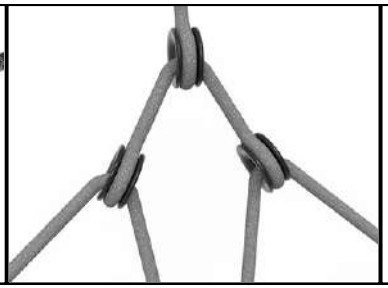
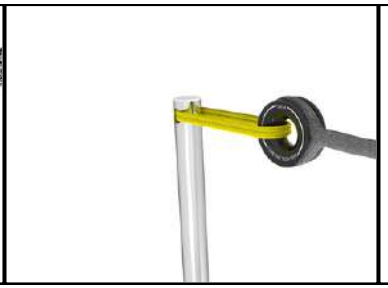
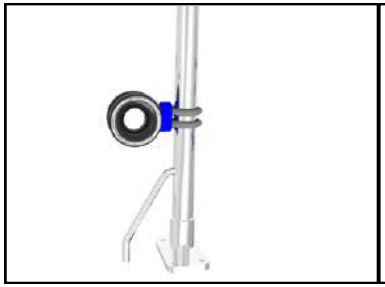
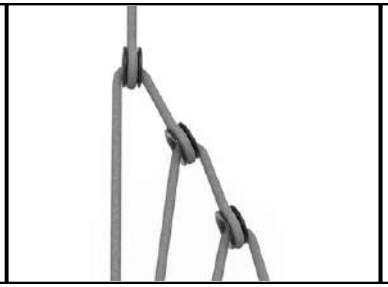
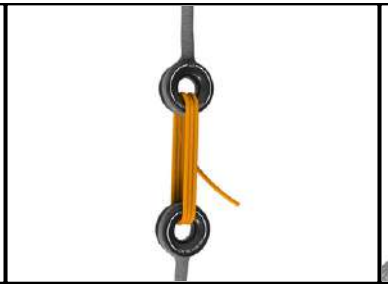
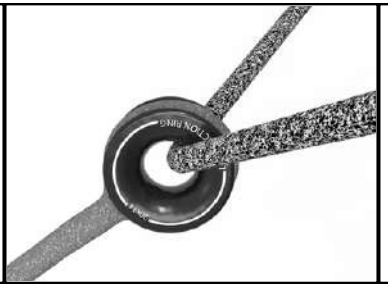
|  |  |  |  |  |
| Spinnaker Twing | Lazy Jacks | Inhaulers | Thimbles for synthetic life & other rigging | Turnbuckle |
|  |  |  |  |  |
| Furling Lead | Cascading Back Stay Adjuster and Boom Vangs | Block and Tackle | Backstay Bridle | Inhaulers |

# Low friction ring’s sizes

The rings have slightly different radii. What is important, though, is that they are all available in various sizes, and each one is labeled with the **appropriate size** for its intended use.

Each size corresponds to a specific workload and route, as detailed in the tables below.


**XS-8x5** **S-14x10** **M-20x14** **L-28x20** **XL-38x28**

## Strength calculation of a rope (Simplified approach)

The calculation to determine the breaking load required for your simplified sheet is as follows

**Sail area ($m^2$) x Wind speed$^2$ (in kts) x 0.021 = Working load (in daN) x 5 = Breaking load**

Quick formula below :

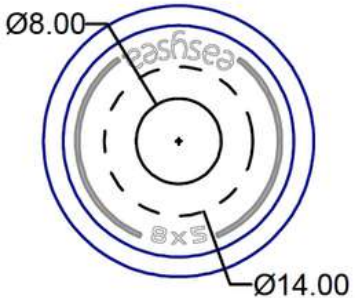
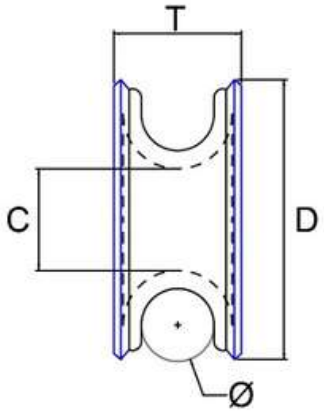
Breaking strength of halyard or mainsheet required = Genoa area x 80
Breaking strength of the halyard or mainsheet required = Mainsail area x 100
Breaking strength of the Spinnaker halyard or sheet required = Spinnaker area x 30

**Comparative table :**

| Deflection angle | Load Factor |
|---|---|
| 180° | 200% |
| 160° | 197% |
| 140° | 187% |
| 120° | 173% |
| 90° | 141% |
| 75° | 122% |
| 60° | 100% |
| 45° | 76% |
| 30° | 52% |
| 20° | 35% |

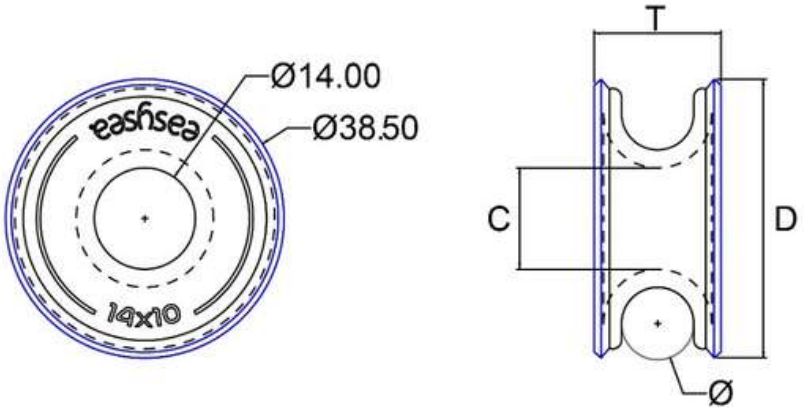
# Olli ™


**XS - 8x5**

| TECHNICAL CHARACTERISTICS | | |
|---|---|---|
| **Olli™ XS 8X5** | **ATTRIBUTE** | **VALUE** |
|  | **MATERIAL RING** | **Aluminum 6082** |
| | **TREATMENT** | **Hard black anodized** |
| | **IMPACT PROTECTION** | **EPDM rubber** |
|     | **LINE Ø** | **5 mm** |
| | **C (CENTER HOLE Ø)** | **8 mm** |
| | **T (THICKNESS)** | **12,60 mm** |
| | **D (DIAMETER)** | **25,50 mm** |
| | **WEIGHT** | **7 gr** |
| | **MAX WORKING LOAD** | **600 Kg** |
| | **BREAKING LOAD** | **1200 Kg** |

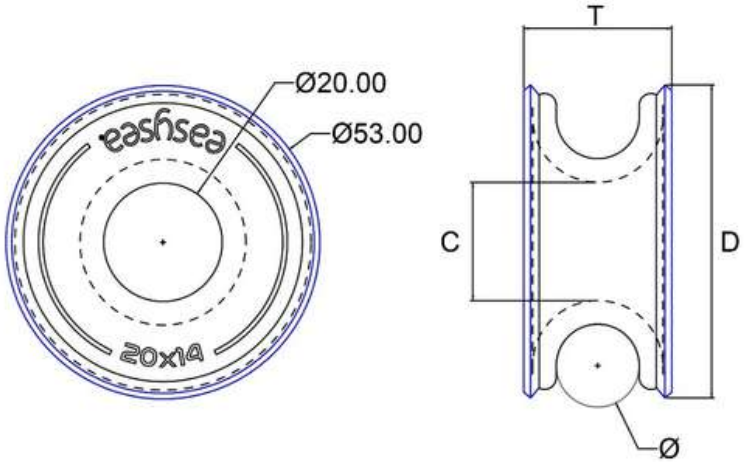
# Olli ™


**S - 14x10**

| TECHNICAL CHARACTERISTICS | | |
|---|---|---|
| **Olli™ S 14X10** | **ATTRIBUTE** | **VALUE** |
|  | **MATERIAL RING** | **Aluminum 6082** |
| | **TREATMENT** | **Hard black anodized** |
| | **IMPACT PROTECTION** | **EPDM rubber** |
|  | **LINE Ø** | **10 mm** |
| | **C (CENTER HOLE Ø)** | **14 mm** |
| | **T (THICKNESS)** | **17,60 mm** |
| | **D (DIAMETER)** | **38,50 mm** |
| | **WEIGHT** | **13 gr** |
| | **MAX WORKING LOAD** | **1600 Kg** |
| | **BREAKING LOAD** | **3600 Kg** |

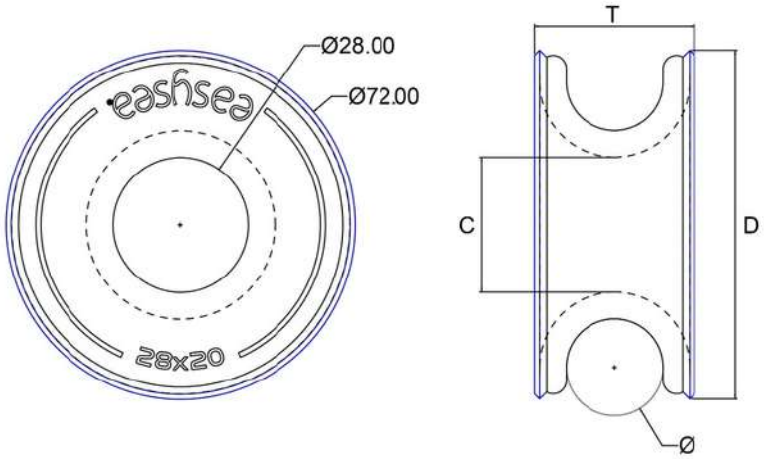
# Olli ™


**M - 20x14**

| TECHNICAL CHARACTERISTICS | | |
|---|---|---|
| **Olli™ M 20X14** | **ATTRIBUTE** | **VALUE** |
|  | **MATERIAL RING** | **Aluminum 6082** |
| | **TREATMENT** | **Hard black anodized** |
| | **IMPACT PROTECTION** | **EPDM rubber** |
|  | **LINE Ø** | **14 mm** |
| | **C (CENTER HOLE Ø)** | **20 mm** |
| | **T (THICKNESS)** | **17,60mm** |
| | **D (DIAMETER)** | **53 mm** |
| | **WEIGHT** | **39 gr** |
| | **MAX WORKING LOAD** | **3200 Kg** |
| | **BREAKING LOAD** | **6400 Kg** |

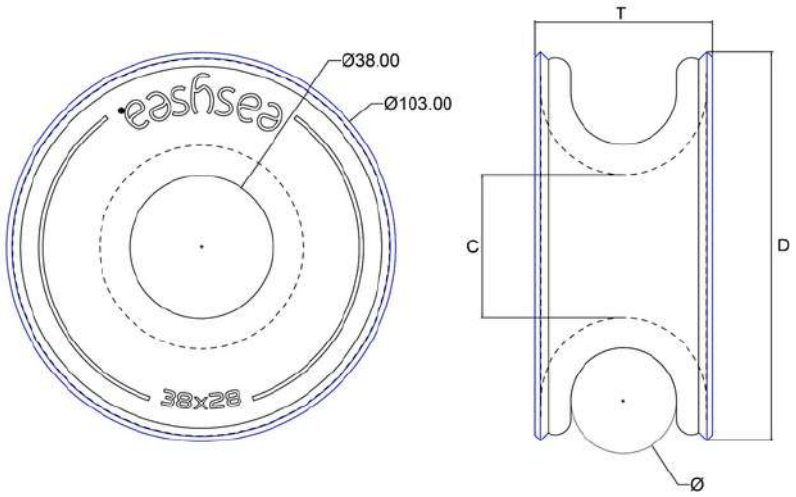
# Olli ™


**L - 28x20**

| TECHNICAL CHARACTERISTICS | | |
|---|---|---|
| **Olli™ L 28X20** | **ATTRIBUTE** | **VALUE** |
|  | **MATERIAL RING** | **Aluminum 6082** |
| | **TREATMENT** | **Hard black anodized** |
| | **IMPACT PROTECTION** | **EPDM rubber** |
|  | **LINE Ø** | **20 mm** |
| | **C (CENTER HOLE Ø)** | **28 mm** |
| | **T (THICKNESS)** | **33,20 mm** |
| | **D (DIAMETER)** | **72 mm** |
| | **WEIGHT** | **107 gr** |
| | **MAX WORKING LOAD** | **6400 Kg** |
| | **BREAKING LOAD** | **12800 Kg** |

# Olli™


**XL - 38x28**

| TECHNICAL CHARACTERISTICS | | |
|---|---|---|
| **Olli™ XL 38X28** | **ATTRIBUTE** | **VALUE** |
|  | **MATERIAL RING** | **Aluminum 6082** |
| | **TREATMENT** | **Hard black anodized** |
| | **IMPACT PROTECTION** | **EPDM rubber** |
|  | **LINE Ø** | **28 mm** |
| | **C (CENTER HOLE Ø)** | **38 mm** |
| | **T (THICKNESS)** | **47 mm** |
| | **D (DIAMETER)** | **103 mm** |
| | **WEIGHT** | **317 gr** |
| | **MAX WORKING LOAD** | **10000 Kg** |
| | **BREAKING LOAD** | **20000 Kg** |

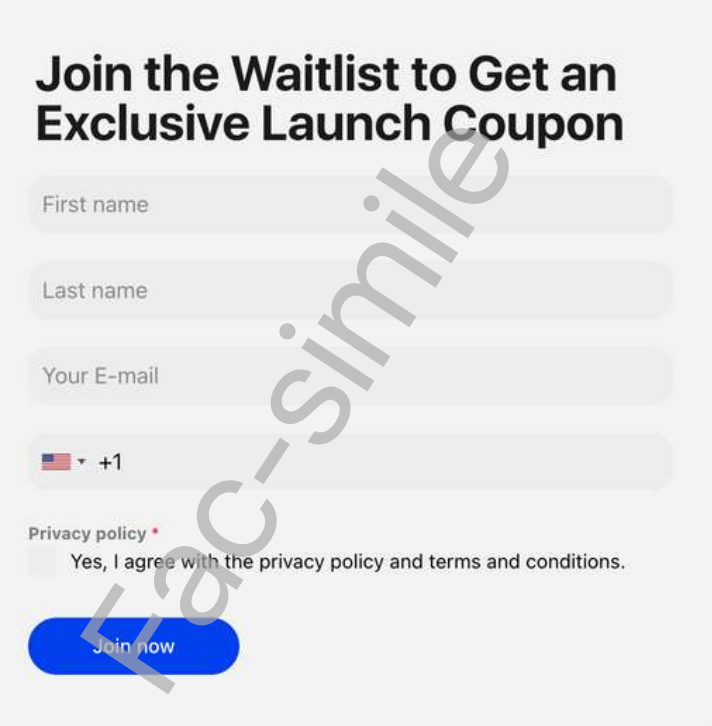
# Conclusion

This document aimed to showcase the **remarkable capabilities** of such a **small tool**.
If you were not familiar with low friction rings, **we hope to have satisfied your curiosity** by highlighting the pros and cons of this nautical device.

We would like to remind you that **Olli**, the low friction ring designed and produced by easysea, **is set to launch** in the coming days, successfully **addressing the old issues related to noise and deck scratches.**

By signing up for the **waiting list,** you will have the opportunity to access the **early purchase of Olli**, which will be distributed at a **launch price** and in **limited quantities.**

Join easysea, where nautical problems meet creative and innovative solutions.

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