



# Spotter Mooring Guidelines

## Draft v 2.0

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This document is not yet complete. Please share carefully as it may change before publication.

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## Sofar Mooring Guidelines

### Sofar Spotter Usage



**Free floating:** For free-floating deployments, Spotter is ready to go right out of the box. Follow the instructions in your [user guide](#) to activate and deploy your device.



**Moored:** For moored applications, you will need to build a mooring to anchor Spotter to the seafloor. Mooring a Spotter is a compromise between securing Spotter in place and minimizing constraints on Spotter's motion so that it can collect accurate ocean data from motion.



## DISCLAIMERS:

**Every mooring location and situation is different — one size does not fit all.**

This document provides general mooring guidelines and best practices. The information in this document may not apply to your specific mooring use case. Ultimately, you are responsible for your own mooring. Sofar makes no representations or warranties, either express or implied, as to the suitability of the mooring designs described in this document or their fitness for your particular purpose. Similarly, Sofar is not liable for any damages caused as a result of your use or reliance upon this mooring guideline document.

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# Mooring Considerations

## Optimal Spotter Location for Data Collection

The optimal location for a Spotter is dependent on the use case. Before selecting a mooring site, it is important to identify the data collection goals. Wherever Spotter is moored, it will collect hyper-local data for that location.

- A Spotter moored offshore with an unobstructed fetch will collect the highest accuracy data for incident swell and wind-driven waves along that stretch of coastline
- A Spotter moored in a bay or cove will make accurate observations of the sea state at its location. The Spotter may not, however, be the best indicator of offshore conditions due to the interaction of the wind, waves, and swell, with the nearby coast.

## Placement Consideration

The following physical parameters should be taken into account before selecting a mooring site:

- Spotter is not designed to be continuously submerged and should be placed outside the surf zone.
- Spotter should be moored outside of shipping lanes and away from heavy boat traffic.
- The mooring should be safely away from reef structure, rocks, or debris.
- The mooring should not be on a slope or near a drop-off where the anchor can slip.

## Regulations



It is your responsibility to ensure that Spotter is deployed in a safe and legal manner, obtain the proper permits, and file the necessary notifications.

## Mooring Design Guidelines

### Mooring Types

#### Double Catenary Design

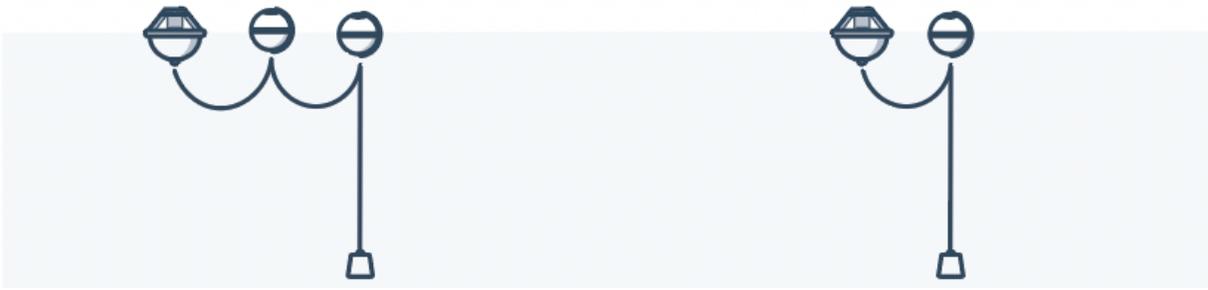
- The double catenary design is our default recommendation.
- Delivers the highest quality wind/wave data in most situations.
- Good for most coastal mooring applications.

Best used in areas with big waves ( > 6ft (2m) ) or strong sustained currents ( > 2.5kts (1.25m/s) ).

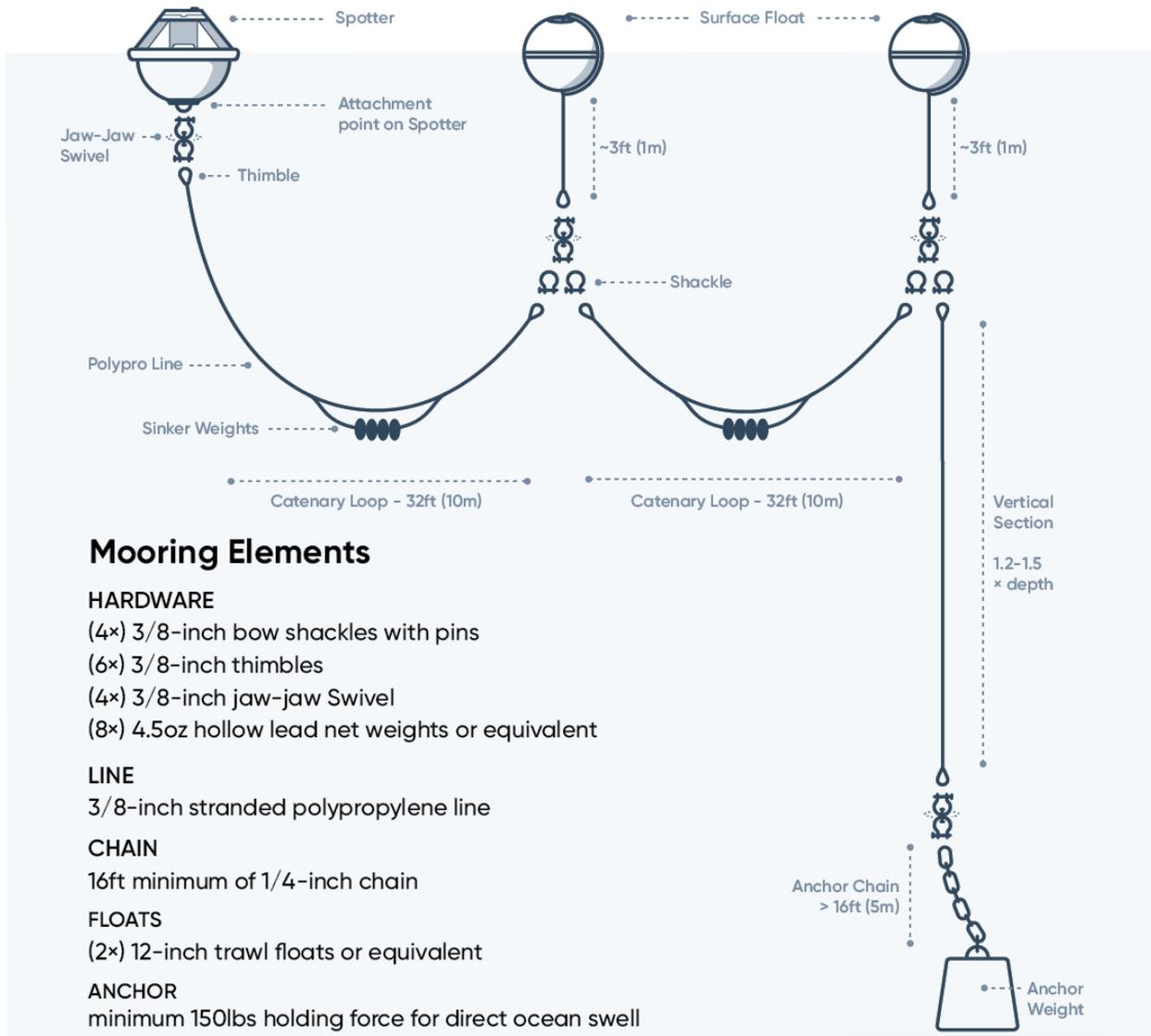
#### Single Catenary Design

- Has a reduced surface expression and is simpler and easier to deploy/recover.
- May see some mooring effects on the data in areas with higher sustained currents and/or in abnormally large waves.

Best used when surface expression size or entanglement risks are higher or in areas with smaller waves and less sustained currents.



## Mooring Elements



[Double Catenary Design Shown]

For more detailed descriptions of the mooring elements shown in the diagrams, see below.

### Surface Float(s)

Sofar recommends one surface float per catenary loop with around **20lbs (10kg) of buoyancy**. These small trawl floats provide enough positive buoyancy while minimizing drag. We use a 12-inch (300mm) centerhole submersible trawl float.



Some deployments may require a higher visibility float to help avoid boat strikes. Higher visibility floats can be larger and therefore require heavier line, connection hardware, and anchor. Alternatively, a separate high visibility marker can be placed outside the watch circle.

## Line Type

Sofar recommends a medium to medium-hard lay braided commercial fishing line, **minimum of 5/16-inch (8mm)**. We use a 3-stranded 3/8-inch (10mm) polypropylene lead-free sinking “crab line.”

## Catenary Section Length

Each catenary section should be **32ft (10m)**

## Vertical Section Length

The vertical section should be **1.2 to 1.5 times the depth**.

## Connection Hardware

All Spotter hardware should be sized appropriately for the mooring and constructed with marine-grade materials. Sofar recommends **316 stainless steel, forged** (not cast). Hardware should be a **minimum of 5/16-inch (8mm)**.



Avoid galvanic corrosion by only using similar metals. Galvanic corrosion can act very quickly and cause a mooring to fail.

Note that the attachment point on Spotter is 316 stainless steel.



Galvanic corrosion caused by pairing stainless steel with galvanized chain. More info can be found on [this helpful rigging website](#).

## Anchor Chain

The lower section of the mooring should be a small length of chain. This serves two functions: (1) to prevent abrasion of the mooring line on the anchor or surroundings at the seafloor and (2) to add compliance in the mooring to absorb strong impulses from large waves.

Since the size and weight of the chain are important to the compliance of the mooring. We recommend using more than **5lbs (2.2kg) per 10ft (3m)** of chain. We use 16ft (5m) of 1/4-inch (6mm) chain which is 0.57lb/ft (0.85kg/m).

## Anchor

An anchor should be appropriately sized for buoyancy, drag, and expected conditions. Sofar recommends **150lbs (70kg) holding force** for the mooring designs in this document. Sofar uses 3x 50lb kettle bells, as they are widely available and easy to handle on a small boat.

A heavier anchor may be necessary if for many reasons such as:

- Larger surface floats
- Thicker/heavier line and hardware
- Very strong currents
- Abnormally large waves / storms

Some deployments require a stronger holding force with less dry weight. Different geometries (such as pyramid anchors) can be substantially lighter and increase holding force, but will require more complex strategies to recover.

## Maintenance

Sofar recommends servicing the Spotter and the mooring every **6-8 weeks**. Clearing the solar panels, line, and floats of any biofouling will help prevent the mooring from becoming too heavy, entangled, or vulnerable to a strike from a boat or floating debris. Mooring elements should be carefully inspected and/or replaced every year.

## Additional Resources

## **Further Reading**

[Spotter User Guide](#)

[Spotter Technical Reference Manual](#)

## **Trusted Hardware Sources**

[Seattle Marine](#)

[Pacific Net and Twine](#)

## **Mooring Expertise**

[DSA Ocean](#)

[WHOI Mooring Lab](#)