

# Playing it Safe

## What types of tether are available?

### Background Information

Ideally, the best tether is one that is the thinnest to minimize drag, most flexible to not affect piloting the ROV, and has the best power transmission capacity. Unfortunately, to achieve thinner more flexible tether, you need to have the thinnest conductors. But thinner conductors have less power transmission capacity. Also, in order to achieve neutral buoyancy, a tether must include floatation, but this also makes it thicker, which results in more drag. As you can see, there are competing factors that must be taken into consideration when designing tether.

### Tether Types

In order to address the infinite range of operating conditions, VideoRay provides three different types of tethers.

1. VideoRays standard neutral tether is neutrally buoyant and is 0.44 inches (11.2 millimeters) in diameter. It has average power transmission performance, and is generally used in lengths of 250-500 feet (75-150 meters).
2. VideoRays Performance Neutral tether is the thinnest tether and is also neutrally buoyant. It is 0.34 inches (8.7 millimeters) in diameter. Unfortunately, while it has excellent performance in current, it has the highest power loss over longer lengths, and is generally not used in lengths exceeding 130 feet (40 meters).
3. VideoRays negatively buoyant tether (sometimes called extension tether) is both thin at 0.33 inches (8.4 millimeters) and has the lowest power loss. However, it sinks, and is generally used on the surface (when the operator station is far from the water), or for sections that descend to the bottom when working deep. It can be used in lengths up to 600 meters (2000 feet) or more.

### Benefits of Multiple Types

An important benefit of VideoRays tether implementation is that different tethers can be added together to accomplish different missions. For example, if you are working 150 feet above the water on an oil rig, and examining the bottom at a water depth of 500 feet, you could use a 1000 foot section of negative tether at the control panel and a 130 foot performance tether at the submersible.

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