



RETICLE MANUAL

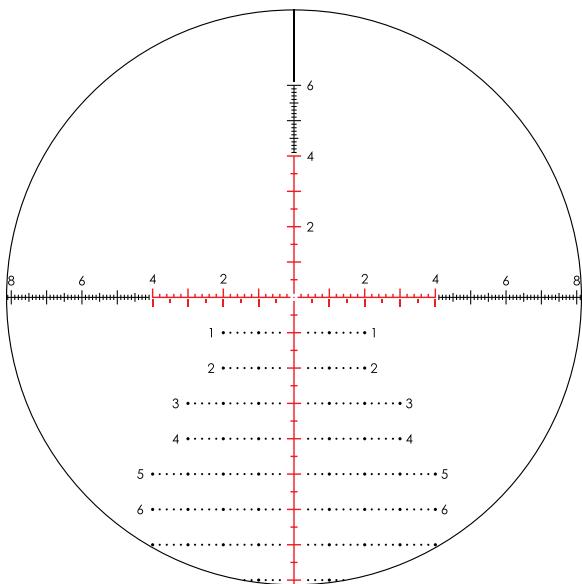
# XLR-2 MRAD RETICLE

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RAZOR® HD LHT™

## VORTEX® XLR-2 MRAD Reticle

Designed to maximize long-distance shooting and ranging abilities, the XLR-2 reticle can be used to effectively determine ranges, holdovers, windage corrections, and moving target leads. Ultra-precision etching on the glass reticle ensures that specifications are kept to the tightest tolerances possible. The fine center crosshair subtensions were carefully chosen to provide the optimum balance between precision aiming and low-light visibility. Includes windage reference dots on drop lines.



Images are for representation only. Product may vary slightly from what is shown.

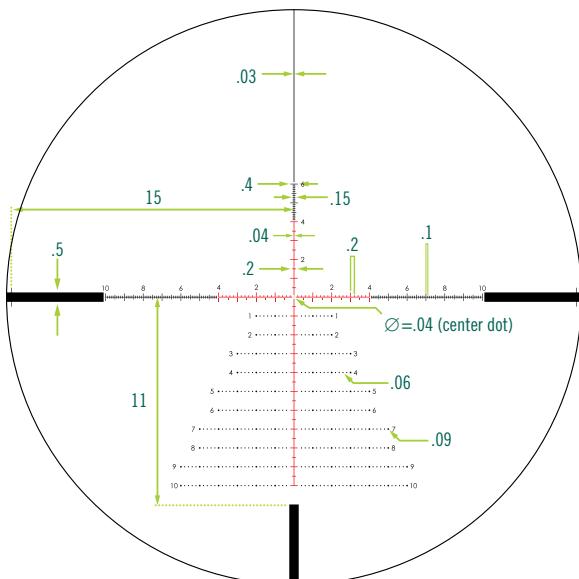
## MRAD Subtensions

The XLR-2 MRAD reticle is based on the milliradian, or MRAD for short. MRAD unit of arc measurements are based on the radian. A radian is the angle subtended at the center of a circle by an arc that is equal in length to the radius of the circle. There are 6.283 radians in a circle and 1000 milliradians in a radian for a total of 6,283 milliradians (MRAD) in a circle. An MRAD will subtend 3.6" at a distance of 100 yds. (10cm at a 100m). Most riflescopes with MRAD adjustments use 0.1 MRAD clicks which subtend 0.36" at 100 yds. (1cm at a 100m).

## First Focal Plane Reticle

In First Focal Plane riflescopes, the listed MRAD subtensions of the XLR-2 MRAD reticle are valid at all magnification levels. This means the shooter can use the magnification level most appropriate for the situation and still have effective holdover and windage reference marks.

## Reticle Subtensions



Subtensions measured in MRAD.  
Reticle image shown for representation only.

## RANGING

MRAD measurements are very effective for ranging using a simple formula. To use this formula, the shooter needs to know the size of the target or nearby object in inches.

### MRAD Ranging Formulas

$$\frac{\text{Target Size (yds.)} \times 1000}{\text{Measured MRAD}} = \text{Range (yds.)}$$

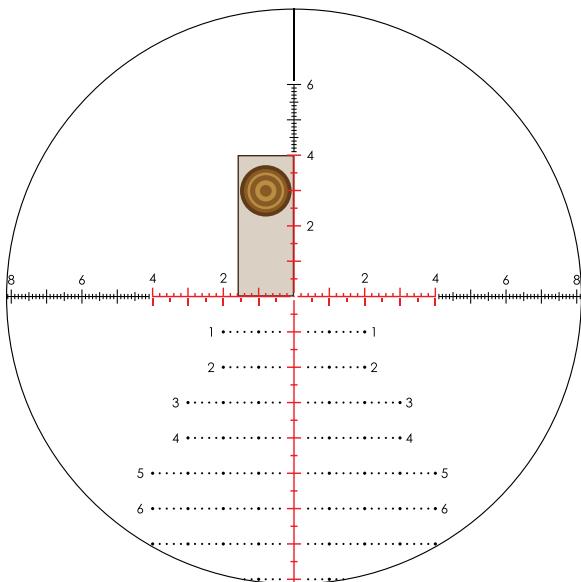
$$\frac{\text{Target Size (m)} \times 1000}{\text{Measured MRAD}} = \text{Range (m)}$$

$$\frac{\text{Target Size (in.)} \times 27.8}{\text{Measured MRAD}} = \text{Range (yds.)}$$

Using either the vertical or horizontal MRAD scale, place the reticle on the target of known measurement and read the number of MRAD spanned.

Accurate measuring will depend on a very steady hold. The rifle should be solidly braced using a rest, bipod, or sling when measuring. Once you have an accurate MRAD reading, use any of the listed ranging formulas to calculate distance.

Maximum accuracy in ranging will be obtained by calculating exact MRAD measurements—MRAD should be estimated in tenths if possible.

**Ranging Example**

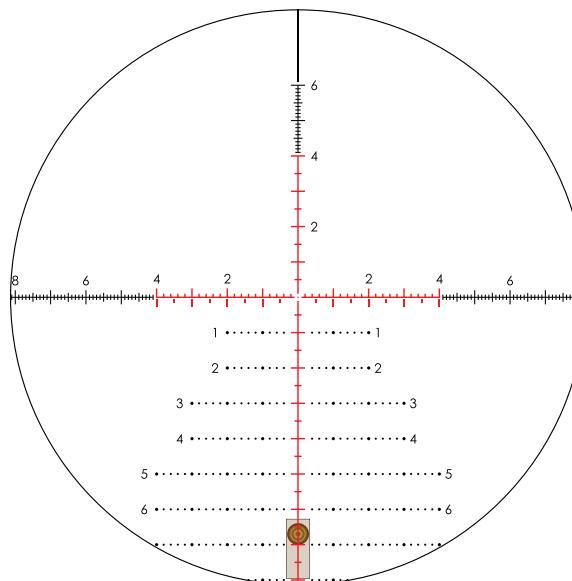
Ranging a 6' target (2 yds.) at 4 MRAD yields 500 yds.

$$\frac{2 \text{ yds.} \times 1000}{4 \text{ MRAD}} = 500 \text{ yds.}$$

**Elevation Holdovers**

Once the distance has been calculated using the reticle or a laser rangefinder, the reticle can be used for rapid holdover correction for bullet-drop of the cartridge being used. To get the most benefit out of the XLR-2 equipped riflescope, Vortex Optics highly recommends shooters learn their bullet-drop numbers in MRAD rather than inches.

Since these reticles are scaled in MRAD, it is an easy job to quickly select the correct drop reference line once the shooter knows the bullet-drop and windage/lead corrections in MRAD. If the shooter prefers to dial for bullet-drop using the elevation turret, knowing bullet-drop in MRAD will allow for much faster adjustments as the MRAD can be quickly read on the elevation turret.

**Example**

6.7 MRAD correction for 800 yd. shot. No wind.

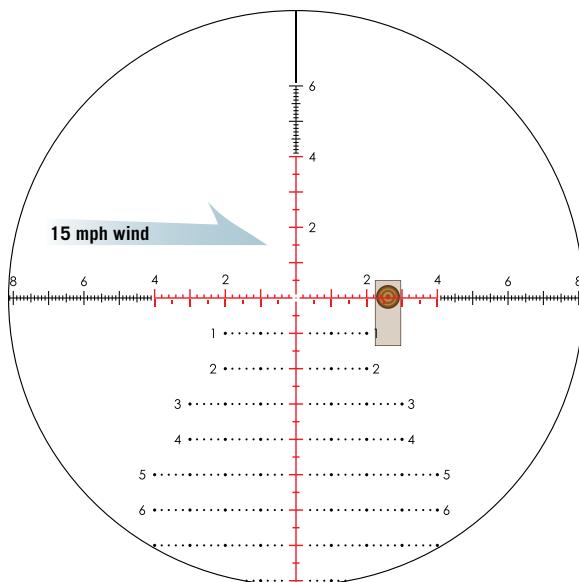
## Windage and Moving Targets

The XLR-2 MRAD reticle is highly effective when used for wind and moving target leads. Using the reticle for effective windage and moving target leads requires thorough knowledge of your weapons system's ballistic performance under varying conditions and experience in reading wind strengths and target speeds. As with bullet-drop, it is important for the shooter to learn a particular weapon's windage/moving target corrections in MRAD rather than inches. Always hold the reticle into the wind.

## Basic Windage Correction on Center Crosshair

When dialing elevation, the center horizontal crosshair will be used for windage or moving lead corrections.

### Example

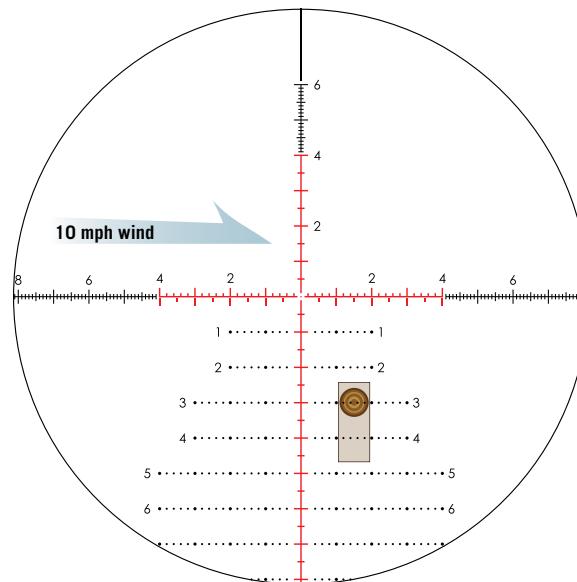


2.6 MRAD correction for 15 mph wind at 700 yds. Elevation already dialed into turret.

## Basic Windage Correction Using Drop Line on Reticle

When using the reticle for elevation correction rather than dialing, the MRAD marks on the center horizontal crosshair can still be used to help visually reference windage corrections. Remember to hold the reticle into the wind.

### Example



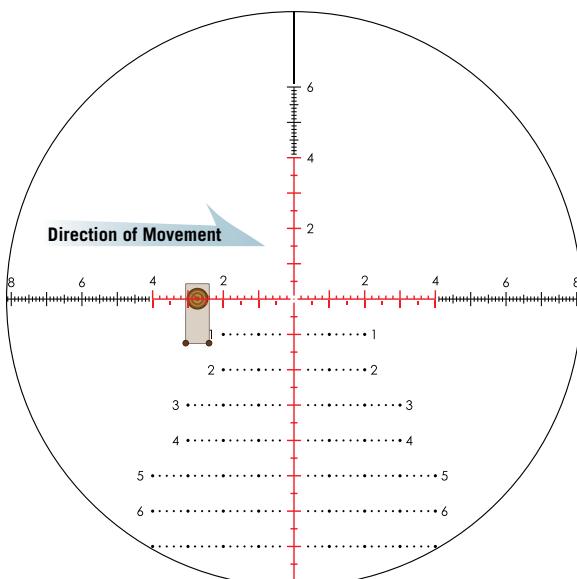
1.5 MRAD correction for 10 mph wind using 3 MRAD drop line at 500 yds.

## Basic Moving Lead Correction

When estimating moving target leads, use the MRAD marks on the center horizontal crosshair. Estimating moving leads will require knowing yardage distance, wind speed, moving target speed, and total bullet flight times including rifle lock time. Bullet flight times can be roughly calculated based on FPS velocities or a ballistic calculator.

**Note:** Correctly estimating moving leads is very difficult and requires considerable practice and knowledge beyond the scope of this manual.

## Example



2.74 MRAD correction for a target moving at 3 mph at 800 yds. No wind.  
Total bullet time of flight from trigger pull is 1.5 seconds during which the target travels 6.6'.  
Elevation already dialed into turret.



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