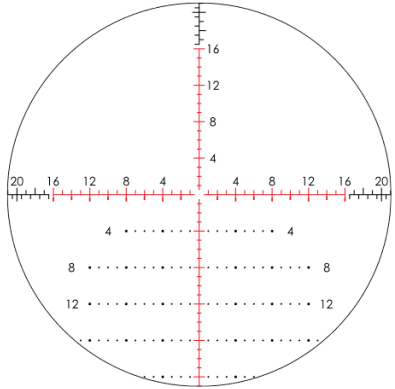
RETICLE MANUAL

EBR-7D
MOA RETICLE

RAZOR® HD GEN III

VORTEX® EBR-7D MOA RETICLE

Designed to maximize long-distance shooting and ranging abilities, the EBR-7D MOA First Focal Plane reticle can be used to effectively determine ranges, holdovers, windage corrections, and moving target leads. Ultra-precision laser etching on the glass reticle ensures that MOA specifications are kept to the tightest tolerances possible. The precise center dot and fine crosshair subtensions on the EBR-7D MOA reticle were carefully chosen to provide the optimum balance between precision aiming and low-light visibility. Including windage and elevation holdover dots in the bottom half of the reticle.



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

MOA Subtensions

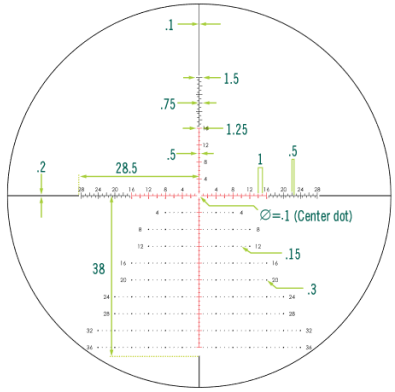
The EBR-7D MOA reticle is based on minute-of-angle (MOA) subtensions. A minute of angle will subtend 1.047 inches at a distance of 100 yards. This Razor HD riflescope uses 1/4 MOA adjustments, which subtend .26 inches at 100 yards.

Note: Although 1 MOA is very commonly corresponded to 1 inch at 100 yards, this is not quite correct: 1 MOA at 100 yards equals 1.047 inches. Calling 1 MOA an inch per hundred yards may be acceptable for short distances, but will cause a five percent error in ranging and holdovers. This could result in missed shots at longer ranges.

First Focal Plane Reticles

In first focal plane riflescopes, the listed MOA subtensions of the EBR-7D MOA reticle are valid at all magnification levels. This means the shooter can use the magnification level most appropriate for the situation and still have accurate holdover and windage reference marks. This is also extremely valuable in a high-stress situation, as the shooter does not have to remember to set the scope to one particular magnification to get valid holdovers—an action necessary with second focal plane reticles.

Reticle Subtensions



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

RANGING

MOA measurements are very effective for ranging using a simple formula.

MOA Ranging Formulas

$$\frac{\text{Target Size (inches)}}{\text{Measured MOA}} \times 95.5 = \text{Range (yds.)}$$

$$\frac{\text{Target Size (inches)}}{\text{Measured MOA}} \times 87.3 = \text{Range (m)}$$

$$\frac{\text{Target Size (m)}}{\text{Measured MOA}} \times 3438 = \text{Range (m)}$$

$$\frac{\text{Target Size (cm)}}{\text{Measured MOA}} \times 34.38 = \text{Range (m)}$$

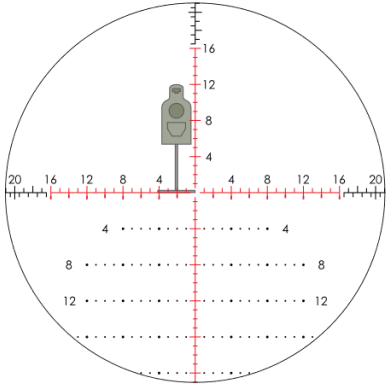
To use these formulas, the shooter needs to know the size of the target or nearby object in inches, cm, or meters. For the most accurate answer, use the longest dimension. If the object's taller than it is wide, it is best to use the objects height in the formula if possible.

Using either the vertical or horizontal MOA scale, place the reticle on a target of known dimensions and read the number of MOA spanned. You will obtain the best results if measured to the nearest 1/4 MOA.

Accurate measuring will depend on a very steady hold. The rifle should be solidly braced using a rest, or bipod when measuring. Once you have an accurate MOA reading, use the formula to calculate the distance.

Note: In the MOA ranging formula, a shooter may substitute 100 for 95.5 in the interest of speedier calculations. Be aware that this will produce a five percent over-estimation error of the yardage distance obtained.

Ranging Example



Ranging a 6' target (72") at 12 MOA yields 573 yds.

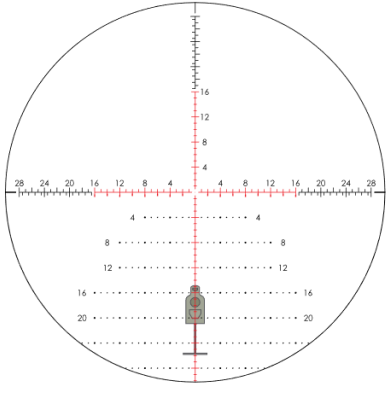
$$\frac{72"}{12\ \text{MOA}} \times 95.5 = 573\text{yds.}$$

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 EBR-7D equipped riflescope, Vortex Optics highly recommends shooters learn their bullet drop numbers in MOA rather than inches.

Since both the reticle and turrets are scaled in MOA, it is easy to line up your bullet drop/wind hold with the corresponding MOA hashmark on the reticle. If the shooter prefers to dial the turret, instead of holding over on the reticle, knowing the bullet drop/wind hold in MOA will allow for much faster adjustments as MOA can be quickly read on the elevation knob.

Example



17.5 MOA correction for 625 yd. shot. No wind.

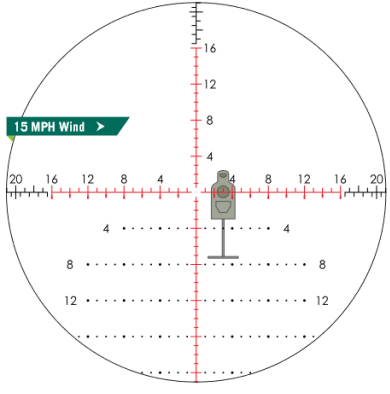
Windage and Moving Targets

The EBR-7D MOA reticle is highly effective when used for wind and moving target leads. Using the reticle for effective windage and moving target leads will require thorough knowledge of your weapons system's ballistic performance under varying conditions and experience in reading wind strengths and target speeds. As a bullet drops, it is important for the shooter to learn a particular weapon's windage/moving target corrections in MOA rather than inches. Always hold the reticle into the wind.

Basic Windage Correction on Center Crosshair

When dialing elevation, use the horizontal crosshair for windage or moving lead corrections.

Example

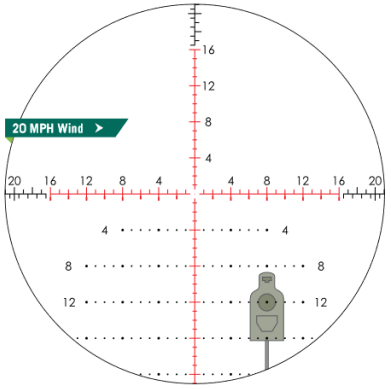


3 MOA correction for 15 mph wind at 700 yds. Elevation already dialed into turret.

Basic Windage Correction Using Drop Line on Reticle

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

Example



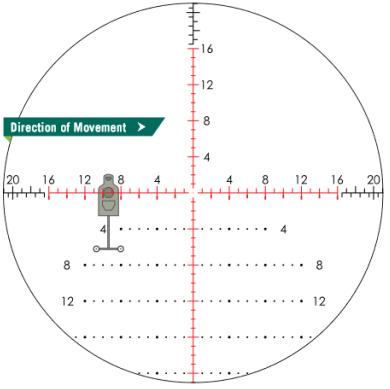
8 MOA correction for 20 mph wind using 12 MOA drop line at 500 yds.

Basic Moving Lead Correction

When estimating moving target leads, use the MOA marks on the 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



9.4 MOA correction for a target moving at 3 mph at 800 yds. No wind. Elevation already dialed into turret.

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