

VORTEX
THE FORCE OF OPTICS®

VIPER® PST™

RIFLESCOPE



Second Focal Plane

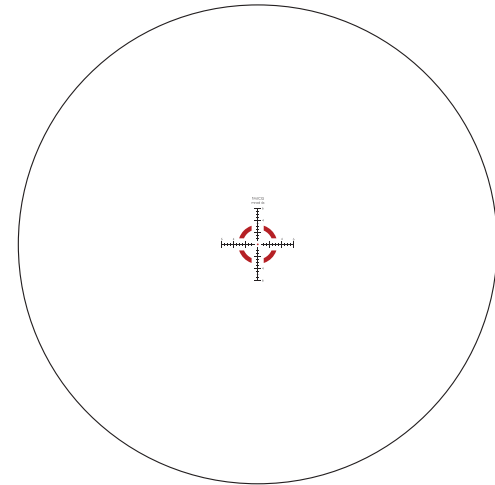
I-4x24 TMCQ RETICLE (MRAD)



The Vorte® TMCQ™ MOA Reticle

Designed to maximize the performance of the Viper® PST™ 1-4x24 in close and mid-range shooting situations, the TMCQ™ mrad reticle can also be used to effectively determine ranges, holdovers, windage corrections and moving target leads.

Once the Viper PST 1-4x24 riflescope has been sighted-in and the turret caps indexed (see the Viper PST riflescope owner's manual), it is ready to be used in the field. The following suggestions are based on using the TMCQ mrad reticle on an AR-15 style rifle chambered in most popular 5.56 mm loads and sighted in at 100 yards. If you are using a different rifle and ammunition, your results will differ somewhat, but the basic information will still apply.



Note: Reticle images shown in this manual are for representation only—images vary between scope models depending on magnification and reticle plane.

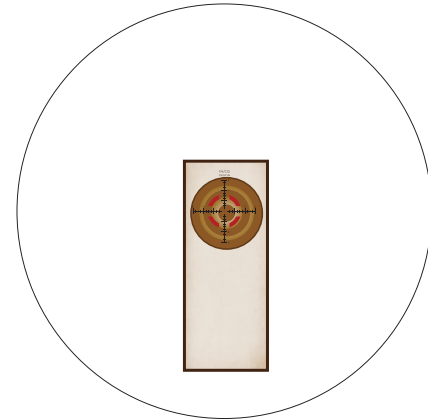
Using at Close Ranges

At short range distances inside of 25 yards, maximum performance will come from using the PST 1-4x24 riflescope set down to lowest 1x magnification and shooting with both eyes open using the heavy outer circle and illuminated center crosshair dot to quickly center the target. On most centerfire applications, actual point-of-impact will be just below the crosshair intersection, as most centerfire rifles have a slight downward cant. On most centerfire applications, actual point-of-impact will be just below the crosshair intersection—typically 1–2 inches low from 0–25 yards.



Using at Intermediate Ranges

For distances of 50–175 yards, more magnification may be used if desired and main crosshairs should still be used in a dead-on hold. For most centerfire applications, actual point-of-impact will typically be .2 inches below the crosshair intersection at 50 yards, dead on at 100 yards and 2.4 inches below crosshair intersection by 175 yards.



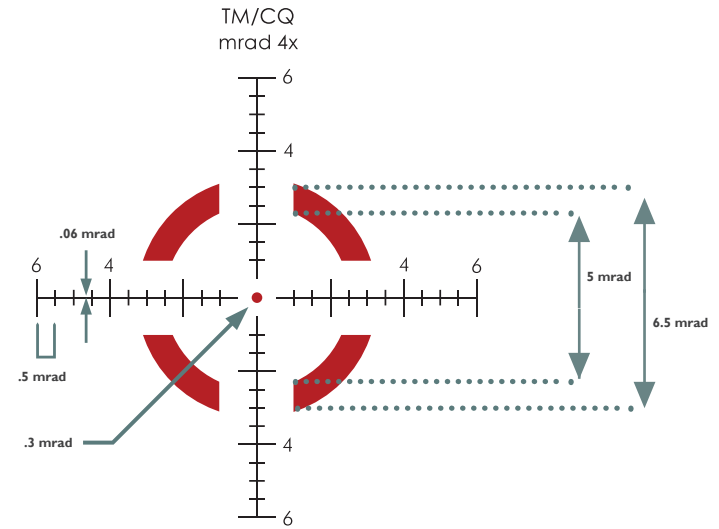
Using at Long Ranges

Once distances approach 200 yards and beyond, the reticle subtension lines can be utilized to compensate for bullet drop. If necessary, reticle subtensions can also be used to help estimate range.

MRAD Adjustments

The TMCQ 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 (mrads) in a circle. These angular measurements are used for ranging and to correct for bullet trajectory drop in riflescopes. An mrad will subtend 3.6 inches at a distance of 100 yards. The Viper PST 1-4x uses .2 mrad clicks which subtend .72 inches per click at 100 yards.

TMCQ Reticle Mrad Subtensions



Note: When used in the second focal plane PST 1-4x24 rifle scope, the mrad subtensions listed in the following diagram are **only** valid at the 4x magnification. On these riflescopes, all ranging and holdover corrections using the reticle subtensions should be done at 4x.

Ranging

The TMCQ mrad reticle can be used for approximate range estimations using simple formulas. To use these formulas, it will be necessary to know the size of the target or a nearby object.

Begin by turning PST 1-4x24 riflescope to a magnification of 4x. Using the inner crosshair with listed mrad dimensions (see subtension diagram), match up to target object and estimate the number of mrads spanned by the object (see example).

Maximum accuracy in ranging will be obtained by estimated mrads as closely as possible and will depend on a very steady hold. The rifle should be solidly braced using a rest, bipod or sling when measuring.

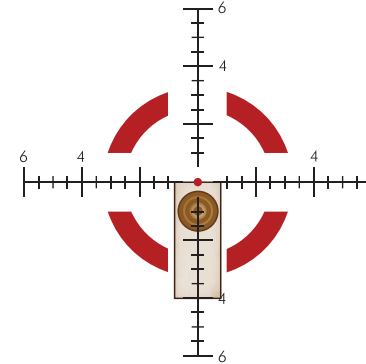
Mrad Ranging Formulas

$$\frac{\text{Target Size (Yards)} \times 1000}{\text{mrads Read}} = \text{Range (Yards)}$$

$$\frac{\text{Target Size (Meters)} \times 1000}{\text{mrads Read}} = \text{Range (Meters)}$$

$$\frac{\text{Target Size (Inches)} \times 27.8}{\text{mrads Read}} = \text{Range (Yards)}$$

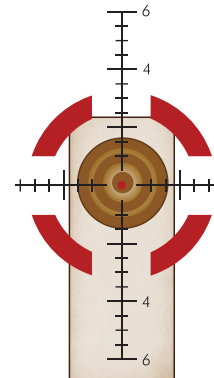
Example



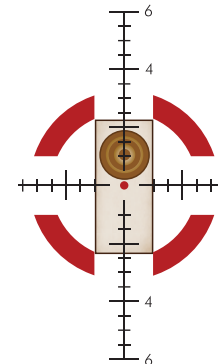
Ranging a 6-foot target (2 yards) at 4 mrads yields 500 yards.

$$\frac{2 \times 1000}{4 \text{ mrads}} = 500 \text{ Yards}$$

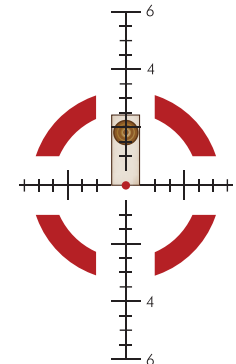
The inner heavy circle can also be used as a quick ranging reference. If the inner heavy circle spans half a 6-foot target's height, it will be approximately 200 yards away. If the standing target completely spans the inside of the circle, it will be approximately 400 yards away. If the target only fits inside half of the inner circle, it will be approximately 800 yards away.



200 Yards



400 Yards



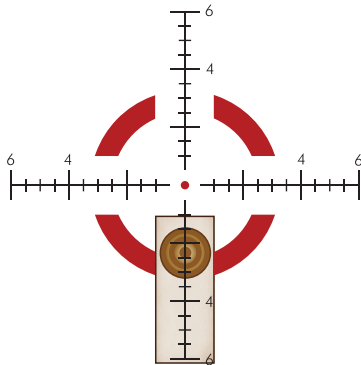
800 Yards

Holdovers

Once the distance has been calculated using the TMCQ mrad reticle or a laser rangefinder, the reticle can be used for rapid holdover correction for the bullet drop of the weapon system being used. To get the most benefit out of the TMCQ mrad equipped riflescope, Vortex Optics highly recommends shooters learn their bullet drop numbers and windage/lead corrections in mrads rather than inches or MOAs. Remember that 1 mrad equals 3.44 MOA (3.6 inches at 100 yards).

Since the TMCQ mrad reticle is marked in mrads, it is an easy job to quickly select the correct drop reference line once the shooter knows their bullet drops and windage/lead corrections in mrads. If the shooter prefers to dial their *come ups* for bullet drop using the elevation knob, again knowing bullet drops in mrads will allow for much faster adjustments as the mrads can be quickly read on the elevation knob.

Example



2.3 mrad correction for 400-yard shot using 5.56 mm. No wind.

**Example of a Custom MRAD Drop Chart for
5.56 mm with 55 gr. FMJBT Bullets at 3000 fps MV**

RANGE (YARDS)	DROP (Mrad)
25	-0.8
50	-0.1
75	0.0
100	-0.0
125	-0.1
150	-0.2
175	-0.3
200	-0.5
225	-0.7
250	-0.9
275	-1.1
300	-1.3
325	-1.5
350	-1.8
375	-2.0
400	-2.3
425	-2.6
450	-3.0
475	-3.3
500	-3.7
525	-4.1
550	-4.5
575	-4.9
600	-5.4
625	-5.9
650	-6.4
675	-7.0
700	-7.6
725	-8.2
750	-8.9
775	-9.6
800	-10.3

Note: Data for other cartridges and loads will vary from what is provided in this chart. Charts like this are easily generated by using the Vortex LRBC at www.vortexoptics.com.



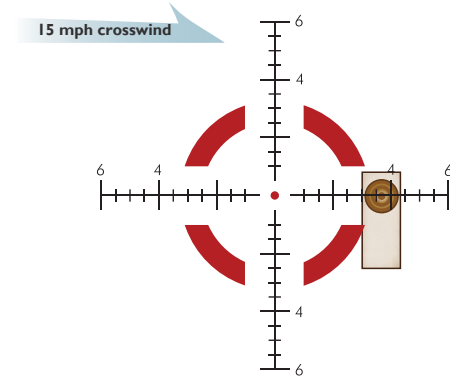
Windage and Moving Targets

The TMCQ mrad reticle can be effectively used for wind and moving target leads. Using the reticle for effective windage and moving leads will require thorough knowledge of your weapon system's ballistic performance under varying conditions and experience in reading wind strengths and target speeds. As in bullet drops, it is imperative the shooter learn their particular weapon's windage/moving target corrections in mrads rather than inches or MOAs.

Whether dialing elevation *come ups* or using the reticle subtensions for holdover, the center horizontal crosshair can be used for windage or moving lead corrections. Mrad marks on the horizontal crosshair are graduated in .5 mrad increments.

Example:

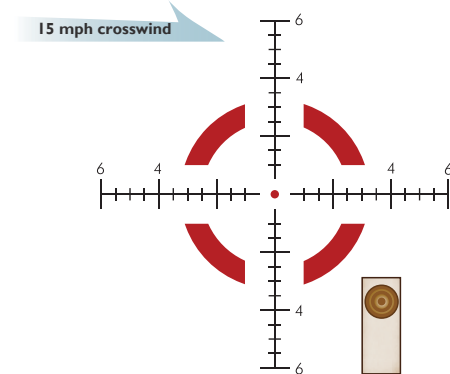
Reticle Correction for Wind with Elevation Correction dialed into Turret



3.6 mrad correction for 5.56 mm in 15 mph crosswind at 500 yards. Elevation correction dialed into turret.

Example

Reticle Correction for Both Elevation and Wind



3.7 mrad holdover and 3.6 mrad windage correction for 5.56 mm in 15 mph crosswind at 500 yards.

THE VIP WARRANTY

We build optics based on our commitment to your absolute satisfaction. That's why Vortex products are unconditionally guaranteed and we make this Very Important Promise to you—a Very Important Person.

Rest assured that in the event your Viper PST becomes damaged or defective, Vortex Optics will repair or replace the riflescope at no charge to you. Call Vortex Optics at 800-426-0048 for prompt, professional, and friendly service.



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Middleton, WI 53562
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Visit www.vortexoptics.com for more information. Canadian customers may visit www.vortexcanada.net for customer service information.

Note: The VIP warranty does not cover theft, loss, or deliberate damage to the product.

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