Reticle Manual
Mil Dot
When used with second focal plane riflescopes it is very important to understand that in order to use the listed subtensions correctly, the scope must be set to a particular magnification (usually the highest). Consult the riflescope owner’s manual for the correct magnification to be used. Of course, the standard center crosshair can always be used at any magnification.

The mil dot reticle subtensions are based on the milliradian (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. These angles and arc scales are used to estimate range and bullet trajectory drop with the mil dot reticle. There are 6.283 radians in a circle and 1000 milliradians in a radian for a total of 6283 milliradians (mrads) in a circle. An mrad will subtend 3.6 inches at a distance of 100 yards. Most riflescopes with mrad adjustments use .1 mrad clicks which subtend .36 inches at 100 yards.

### 1 Mil Width at Distances

<table>
<thead>
<tr>
<th>Distance</th>
<th>Subtension (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 yards</td>
<td>3.6 inches</td>
</tr>
<tr>
<td>200 yards</td>
<td>7.2 inches</td>
</tr>
<tr>
<td>300 yards</td>
<td>10.8 inches</td>
</tr>
<tr>
<td>400 yards</td>
<td>14.4 inches</td>
</tr>
<tr>
<td>500 yards</td>
<td>18.0 inches</td>
</tr>
<tr>
<td>600 yards</td>
<td>21.6 inches</td>
</tr>
<tr>
<td>700 yards</td>
<td>25.2 inches</td>
</tr>
<tr>
<td>800 yards</td>
<td>28.8 inches</td>
</tr>
</tbody>
</table>

Vortex Mil Dot Reticle subtensions shown in milliradians (mrad or mils).
**Ranging**

To use a mil dot reticle for ranging purposes, you must have an object of known dimension at the same distance as your target to which you can compare the mil spacing. Then you can use the simple formula below to calculate distance. This easy formula can be used for all ranging situations:

\[
\text{Known Dimension (in yards) } \times 1000 = \frac{\text{Mils Read}}{\text{Yards to Target}}
\]

**Examples of Objects of Known Dimensions**

- A fence post known to be 36 inches tall that is next to the coyote you’re shooting at.
- The brisket-to-back distance of 18 inches on a whitetail buck.
- The height of 10 inches for a standing ground hog.
- A target that is 20 inches in diameter.

Using the first example, place the reticle on the fence post with the horizontal crosshair even with the ground—remember that the scope must be turned to the correct magnification. Reading the mils, the fence post equals 2 mils in height.

Using the formula shown above, you can calculate the distance to the fence post (and the coyote) at 500 yards.

\[
\frac{1 \text{ Yard (36 inches) } \times 1000}{2} = 500 \text{ Yards}
\]

**Windage Compensation**

Using the mil dot reticle for windage and moving target leads will require thorough knowledge of your cartridges ballistic performance and experience in properly reading wind strengths. Again, the scope must be at the correct magnification for this to work.

Remembering that 1 mil equals 3.6 inches at 100 yards, 7.2 inches at 200 yards, 10.8 inches at 300 yards, etc., use the mil dots on the horizontal crosshair to hold-off the required distance. Remember to hold into the wind direction when doing this.

**Example of Wind Drift Compensation**

Let’s say you’re shooting at a target 400 yards away with a small crosswind. Through experience, or after consulting ballistics information, you believe the bullet will wind-drift about 7 inches. At 400 yards, each mil spans 14.4 inches (see chart on page 2), so you’ll need to hold about ½ mil into the wind to correctly compensate and make your shot.
Holdover

Once a target has been ranged, the mil dot reticle can be used to quickly estimate proper hold-over on longer shots. In order to do this, you will have to be very familiar with the ballistics of your particular weapon and ammunition at all distances. It can be very helpful to keep a printed ballistic chart handy. As always, your scope must be set to the correct magnification.

Example of Reticle Holdover

Let’s say you’ve ranged a deer with your mil dot and determined that he is 300 yards away. You’ve zeroed in your rifle at 100 yards, and know through practice and ballistics info that your bullet will drop 11 inches at 300 yards. You know that the mil spacing on the reticle is equal to 3.6 inches at 100 yards. This means the mil spacing will be 10.8 inches at 300 yards. Therefore, to make your shot you’ll need to hold the center crosshair about 1 mil high from the deer’s vital zone.

For additional information on using the mil dot reticle, be sure to consult the Vortex Long Range Ballistic Compensation (LRBC) program. You’ll find this at www.vortexoptics.com.

The LRBC program will allow users to input their specific ballistic information and, then, see a graphic representation of the mil dot reticle displaying specific yardages and wind drifts for each dot.

If you have any questions, contact Vortex Optics. Call us at 800-426-0048 or e-mail service@vortexoptics.com.

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