

The background features a dark blue grid with a semi-circular reticle scale. The scale has numerical markings from 20 to 180 in increments of 10, with finer tick marks between them. The scale is positioned such that it appears to be part of a larger circular instrument.

# RETICLE MANUAL

READ IT BEFORE USE!!!

READ AND UNDERSTAND THE CONTENTS OF YOUR RETICLE MANUAL.

▼ Scan the QR code to learn more about VectorOptics.



VECTROPTICS



USER MANUAL



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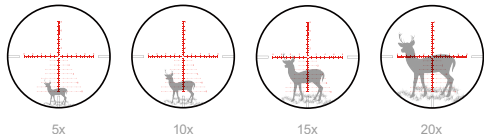
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## SECOND FOCAL PLANE RETICLES

The second focal plane (SFP) reticles are located near the scope's eyepiece behind the image erecting and magnifying lenses.

This style of reticle does not visually change in size when you change the magnification. The advantage of an SFP reticle is that it always maintains the same ideally-sized appearance.

When shooting with this SFP scope, be aware that the listed reticle subtensions used for estimating range, holdover, and wind drift correction are only accurate at the specified magnification.

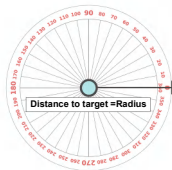


## MILS / MRAD EXPLAINED

MILs, or milliradians, are a unit of measurement dividing radians in a circle. A radian is equal to 57.3 degrees, with  $6.2832 (\pi \times 2)$  radians in a circle. There are 1000 milliradians in 1 radian, and therefore 6,283 milliradians (or mils) in a circle.

1 MIL equals 1/1000 of any shooting distance. So 1 MIL is 1 meter at 1000 meters, and 1 yard (36") at 1000 yards. Then **1 MIL is approximately 10cm at 100m**, 20cm at 200m and so on. Likewise, **1MIL is approximately 3.6 inches at 100 yards**, 7.2 inches at 200 yards and so on.

A mil is so large that it's usually broken into tenths in order to make precise adjustments on your scope turret.

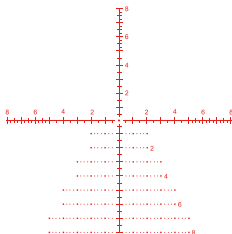


## THE Vector Optics® VCT-20A SFP MIL RETICLE

The **VCT-20A** reticle is designed for precision rifle series competition and other long-range shooting applications with accurate ranging capability.

Etched glass VCT-20A reticle all illuminated w/ digital lines dots & 11 levels illumination, easy for the shooter to identify and engage the target at a substantial distance. Besides, by using the dots or hash marks as reference points, the shooter can quickly and accurately estimate the distance to the target and adjust for bullet drop and windage.

**Compete, Protect, Defence.**



**For VCT-20A reticle, the suspension is valid at 20x.**

To calculate the target height or distance at 10x magnification, you can use the following formula:

**Target height at 10x = Target height at 20x \* (Magnification at 20x / Magnification at 10x)**

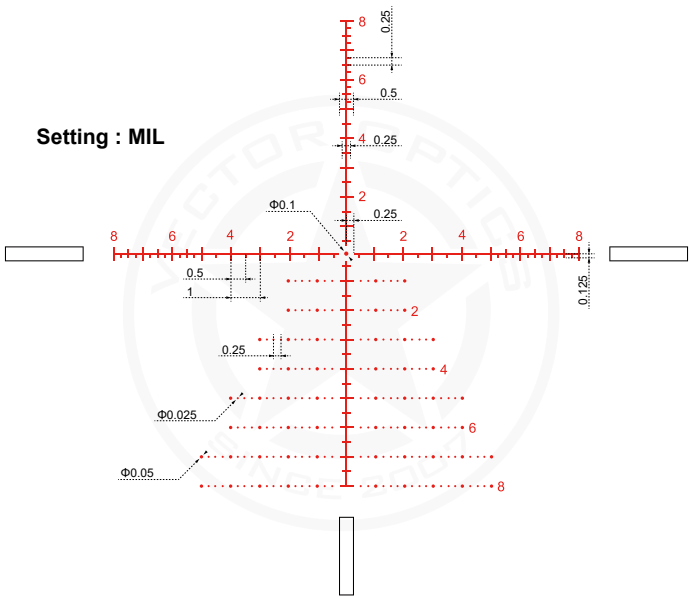
**Distance at 10x = Distance at 20x \* (Magnification at 20x / Magnification at 10x)**

For example, if the target height at 20x magnification is 2 mils and the distance at 20x is 500 yards, and you want to calculate the target height or distance at 10x magnification, you can use the formula as follows:

**Target height at 10x = 2 mils \* (20 / 10) = 4 mils**

**Distance at 10x = 500 yards \* (20 / 10) = 1000 (yards)**

Setting : MIL





## **WIND DRIFT COMPENSATION**

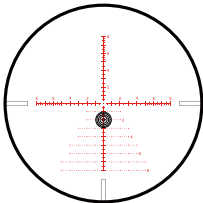
The VCT-20A reticle can help the shooter compensate for wind drift. You can use the horizontal line width changes as reference points to complete wind drift compensation. To compensate for wind drift, first, estimate the wind's speed and direction. Then, using the line width changes, estimate the amount of holdover required to counteract the wind drift.

## **HOLDOVER FOR COMPENSATION BULLET DROP**

Holdover refers to the technique of adjusting the aim of a firearm to compensate for the effect of gravity on the bullet's trajectory. Bullet drop is the decrease in bullet height as it travels through the air. The shooter can use the MIL markings on the reticle to calculate the bullet drop. The MIL markings on the vertical axis represent the distance in MILs between each hash mark. The horizontal axis represents the windage adjustment.

For example, under no wind condition, after zeroing your scope at 100m, if you know your target is at 500m and your ammo has a 1m bullet drop at that distance, you will need to use 2MIL holdover point. Here is how you get the 2MIL: since 1MIL equals 10cm at 100m, 50cm at 500m, and then 2MIL equals  $2 \times 50\text{cm} = 1\text{m}$  at 500m, you need to hold the 2MIL drop point to compensate for the 1m bullet drop, thus bring the aim point to line up with the bullet's point of impact.

When it comes to wind correction in shooting, there are three key factors to keep in mind: the flying time of the bullet, the velocity and direction of the wind, and the ballistics coefficient (BC) of the bullet. By taking into account these three factors, a shooter can make the necessary adjustments to account for wind drift and achieve accurate shots even in challenging conditions.



2MIL / 1m holdover for a target @ 500m out. No wind

## RANGING WITH THE MIL-DOT RETICLE

The MIL is an angular measurement -- 1/6400th of a circle -- which equals almost precisely one yard at 1000 yards or one meter at 1000 meters. To use the Mil Dot Reticle for ranging, the shooter first needs to know the height of the target in question. Once the height of the target is determined, the shooter can use the Mil Dot Reticle to measure the target in mils. This proportional relationship makes possible a simple formula to compute distances: **(valid at 20x magnification)**

**Height of Target (yards) / mils \* 1000 = Distance to Target (yards)**

If the height of target is in Inches, then the formula should be:

**Height of Target (inches) / mils \* 27.78 = Distance to Target (yards)**

(1 inch ≈ 0.0277778 yards)

This formula works equally well with meters, but don't mix meters and yards:

**Height of Target (meters) / mils \* 1000 = Distance to Target (meters)**

★ Measure the object in yards to find the distance in yards, and use meters to yield distances in meters.

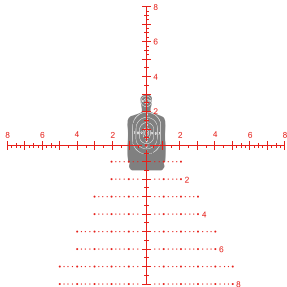
## EXAMPLE

If the height of an adult male is 5.91ft, and measures 4.5Mils across the reticle, that is:

**Distance to Target (yards) / 27.78 \* Mils = Height of Target (inches)**

5.91ft = 70.9 inches

**70.9 (inches) / 4.5 mil x 27.78 = 438 (yards)**



## HOW TO MEASURE TARGET HEIGHT

If the distance of the target is determined, then the shooter can use the Mil Dot Reticle to measure the target height. You can use the following formula:

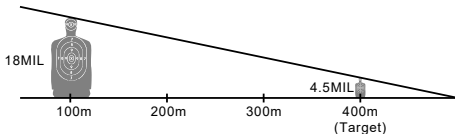
**Distance to Target (yards) / 1000 \* Mils = Height of Target (yards)**

**Distance to Target (yards) / 27.78 \* Mils = Height of Target (inches)**

(1 inch ≈ 0.0277778 yards)

This formula works equally well with meters, but don't mix meters and yards:

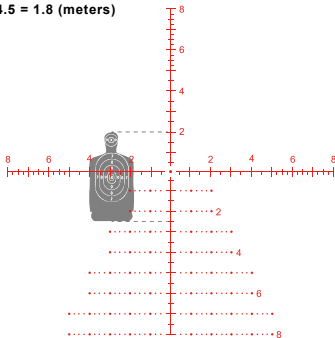
**Height of Target (meters) / mils \* 1000 = Distance to Target (meters)**



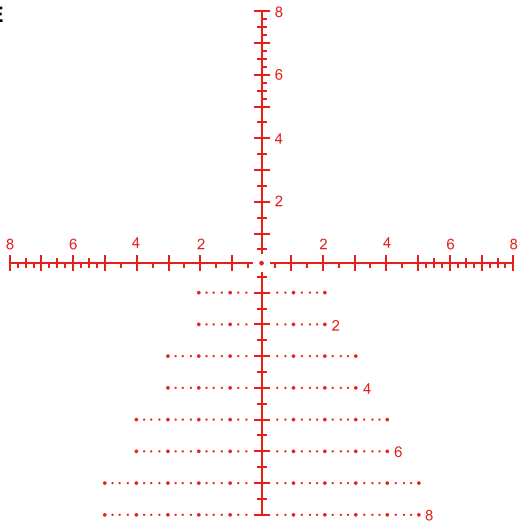
## EXAMPLE

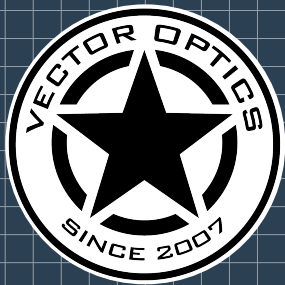
If the Distance to Target is 400m, and the target measures 4.5Mils across the reticle, then the target height is:

$$400 \text{ (meters)} / 1000 * 4.5 = 1.8 \text{ (meters)}$$



# NOTE





# VCT-20A

## USER MANUAL

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