Jeff Hoffman's Wind Formula

By

Major John L. Plaster, USA (ret)

In addition to being the founder and president of Black Hills Ammunition, Jeff Hoffman is a reserve lawman and senior SWAT sniper – and, understandably, a pretty fine rifleman. I've witnessed him make first-round hits with a .338 Lapua Magnum at 1250 yards, which attests to his ability to apply the ballistic theories inherent in his business.

Not long ago, Hoffman shot in a competition with other police and military snipers and, despite shooting exceedingly well to 600 yards, he was decisively out-shot at greater distances. Why? Because, Hoffman concluded, the GIs were accustomed to calculating wind effects and adeptly applying them to long-range fire.

"Humility," he explained, "is a great motivator." With that, he set out to develop his own formula to quickly, simply and accurately calculate and compensate for wind. Further, he wanted his formula to be easily remembered and quickly done in the field without relying on charts or a handheld calculator.

To accomplish this, he had special steel targets constructed, then began shooting long-range tests in windy conditions. He also sat down at his computer and started analyzing ballistic programs to study trajectories and wind effects on .308 projectiles. After months of theorizing and testing he solved the problem -- yielding a pretty impressive new means for calculating windage corrections and applying it as Minutes of Angle.

[Note: In a previous article I detailed Minutes of Angle (MOA) as a rifleman's basic unit of measurement. See "Mastering Your Target Knobs." Down and dirty: One MOA equals one inch at 100 yards, two inches at 200 yards, five inches at 500 yards, etc. Most riflescopes have adjustments with one click equaling ¼ of an MOA, making this a very handy measurement.]

Because Hoffman's solutions are in Minutes of Angle, they can be quickly dialed on a target knob or Bullet Drop Compensator, or used as holdover on a mil-dot reticle or even a conventional riflescope.

Hoffman's Formula

As initially developed, his formula is intended for .308 Match Cartridges, either the 168-gr. BTHP round, or its cousin, the 175-gr. round.

His formula has three basic steps:

1. **Make an accurate range estimate and preliminary wind speed calculation as if it were a 10 MPH full-value wind**
2. **Adjust this calculation for <u>actual wind speed</u>**
3. **Adjust again for <u>actual wind value</u>**

His formula's **<u>First Step</u>** requires estimating the range and then using this figure as RANGE (in hundreds of yards) –1 (a constant) = Required Correction in Minutes of Angle. For the sake of the formula, assume this correction is for a full-value, 10 MPH wind. This means, if your target is 700 yards away, you would calculate: 7 (hundreds of yards) **–** 1 (Jeff's constant) = 6 Minutes of Angle Compensation.

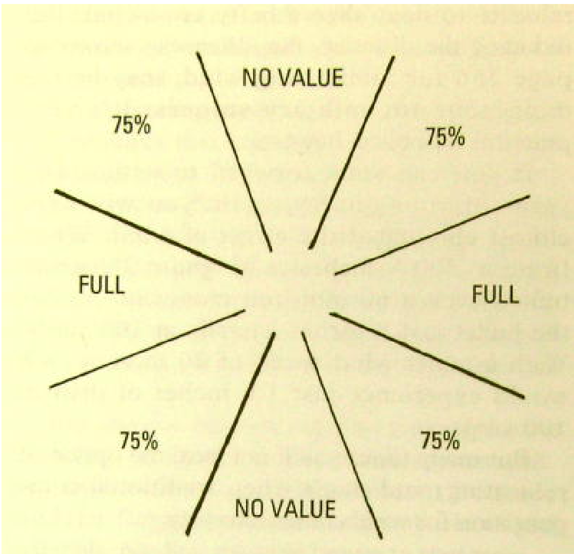
I emphasize: This first step does NOT consider the actual wind velocity or direction. It is only the First Step of a three-step formula.

His formula's **<u>Second Step</u>**: Adjust the Minutes of Angle Compensation for the <u>actual wind velocity</u>, expressed as a <u>percentage of a 10 mph wind</u>. Continuing with our first example, with a 700-yard target, let's now consider that the actual wind speed is 5 mph.

Already we found that 6 Minutes of Angle [7 – 1 = 6 MOA] was yielded, so we now multiply that 6 by 0.5 because the Actual Wind is 5 mph. Therefore, in this second step we multiple 6 MOA x 0.5 (MPH) = 3 MOA of correction.

I emphasize, use as precise a means as possible to determine the wind speed. Jeff (and I) recommend Kestral electronic wind gauges, which are reasonably priced. Keep in mind that this only measures the wind where you are, but this becomes a handy yardstick for estimating the wind between you and the target.

The **Third Step** applies Step Two's result to the angle of the wind on your bullet's flight. Be careful in considering the angle of the wind and correctly giving it a value for that angle. In the graph, below, note how a wind half-way between No Value and Full Value isn't a half-value wind but a three-quarters value wind.



If it's a ¾ value (such as blowing across the target from 2 o'clock or 10 o'clock) multiply the previous result by 0.7 (We rounded down 7.5 to avoid fractions). So the final result is 3 MOA x 0.7 = 2.1 MOA, rounded off to 2 MOA. This means that you would adjust your target knob into the wind 2 MOA or 8 clicks of windage on a ¼ MOA increment riflescope. Or, you would hold the equivalent of 2 MOA into the wind – at 700 yards, that means holding 14 inches into the wind.

Restating Our Example

To keep things clear, let's follow the example again, from beginning to end.

Your target is 700 yards away. So expressing it in hundreds of yards, we have 7 – 1 (Jeff's constant) = 6 Minutes of Angle. In the second step, that 6 MOA is multiplied by the <u>actual wind velocity</u>, expressed as a <u>percentage of a 10 mph wind</u>. Thus, with a 5 MPH wind, we take that 6 MOA and multiply it by 0.5 = 3 MOA of correction. And finally, in the third step, you apply this 3 MOA to the angle of the wind on your bullet's flight. At 45 degrees, that means ¾ value, so multiple the 3 MOA x 0.7 = 2.1 MOA, rounded off to 2 MOA.

You apply this final result to your scope so you can hit dead-on in this wind.

One point Jeff emphasizes is that this formula works just fine for the .308 Winchester 175-gr. Match load all the way to 1000 yards, but he recommends not employing it for the 168-gr. load after 600 yards. As well, he recommends rounding down your range estimate a bit because his formula slightly overstates the wind at longer distances – thus, consider a 735-yard target as 700 yards. And when you find yourself in especially hot weather or high altitude, he found that his Step One constant is better as -2 rather then -1.

Applying the Formula to Other Cartridges

The Hoffman Formula is caliber-specific for .308 Winchester Match loads, but Jeff experimented with other popular sniping rounds, too. For the .223 cal. 77-gr. Match load, use <u>no constant</u> – in Step One: 700 yards yields 7 MOA. Calculate it the regular way in

Steps Two and Three. In firing tests he's found that this is accurate only to 600 yards because beyond that the wind increasingly drifts the lightweight, 77-grain bullet.

What about the .300 Winchester Magnum? The 190-grain Match projectile is 30 percent less affected by wind than a .308 bullet. In other words, you need only 70 percent of the indicated wind compensation. The easiest way to calculate this is to follow all three steps exactly as explained above, then, as an additional step, multiply the final result by 0.7 (70 percent). Had our earlier example involved a .300 Winchester Magnum, 190-grain Match load, we'd take the final result, 2 MOA, and multiply that by 0.7 which yields 1.4 MOA, rounded off as 1.5 MOA. Thus, dial six clicks on a ¼ MOA increment scope, or hold 1.5 MOA into the wind – at 700 yards that would be 10-1/2 inches.

Similarly, Hoffman found that .338 Lapua Magnum projectiles were 40 percent less affected by wind than a .308 bullet. Therefore, calculate exactly as if the .338 were a .308 round through all three steps, and then multiply the final result by 0.6 (sixty percent) for the windage adjustment.

I congratulate Jeff Hoffman for his contribution to long-range shooting, both through this well developed formula, and his excellent ammunition. You can visit his website at www.black-hills.com

The End