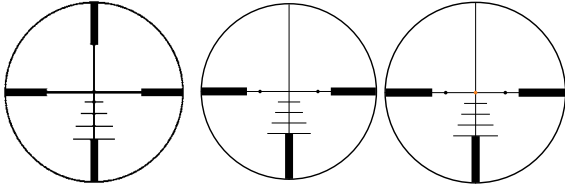


TDS



Reticle

TDS Tri-Factor Reticle System

Designed by TD Smith*, Licensed to Swarovski Optik North America. This specialized reticle is an advanced aiming system available in many Swarovski riflescopes. Using the crosshair and four range marker bars this reticle will enable the shooter to quickly determine a straight line aim to a target corrected for distance and crosswind. Depending on the cartridge used, this system provides the shooter with an easy means of quickly making the sight adjustment decisions to place an accurate shot out to 700 yards and beyond. As with any rifle and riflescope combination, a shooter must apply good, careful shooting methods, discipline and practice.

Who is TD Smith

* Lt. Col T.D. Smith was a former US Air Force Combat Fighter pilot who taught TOP GUN Fighter school for seven years, flew the combat evaluation of the then new F4E weapon system in North Vietnam, was a member of the 1963 U.S. Pan American Games Centerfire Pistol Team, where he broke a world record in Center Fire pistol competition (the record remains unbroken) and was a member of the 1964 U.S. Olympic Free Pistol Team. He presently serves on the NRA, National Coach Development Staff and coaches the USA Olympic Sport of Shooting.



SWAROVSKI
OPTIK

TDS Tri-Factor Reticle System

The TDS reticle system is designed to accurately place a shot from short to very long distances without any adjustments of the turrets. This reticle is designed to perform several different tasks.

The first is to take the guesswork out of holdover by using the short horizontal lines called marker bars.

All TDS scopes come with 12 factor decals and 3 blanks. You have to first choose which decal to use depending on the cartridge you are using. This decal will represent different yardage points on the main horizontal crosshair and 4 marker bars.

You first have to determine what factor number is correct for your rifle and cartridge. The factor number is simply the bullet drop in inches from 200 to 300 yards with a 200 yard zero. For example, you are firing a 30-06 180 grain Nosler Partition bullet at 2700 feet per second. Ballistic data will show that this bullet will drop 8.5 inches at 300 yards with a 200 yard zero so the factor will be 8.5. In this case you would use the decal that says "Factors 8-9.5". On this decal the main horizontal crosshair would be 100 yards, the 1st marker bar 200 yards, the 2nd marker bar 300 yards, the 3rd marker bar 400 yards and the 4th marker bar 450 yards.

Here's an example of the same bullet in a different cartridge at a faster velocity. You are firing a .300 Weatherby Magnum with a 180 grain Nosler Partition at 3240 feet per second. With a 200 yard zero the bullet will be dropping 5.5 inches at 300 yards. Since the factor is 5.5 you would use the decal that says "Factors 4.7-5.7". On this decal the 100, 200 and 300 yard points will all be on the main horizontal crosshair, the 1st marker bar 400 yards, the 2nd marker bar 500 yards, the 3rd marker bar 600 yards and the 4th marker bar 700 yards.

Another feature of the TDS system is that you can correct for wind. Each end of the marker bars are calibrated for a 10 mph crosswind from the center vertical line. If you have a 10 mph wind blowing from right to left and you've determined the animal is 400 yards away, your decal shows 400 yards is the 3rd marker bar down, hold the left end of that marker bar where you want the bullet to hit.

Distance to a target can also be determined with the TDS system. You must first know the chest depth of the animal you are hunting. There is a chest depth chart for most big game animals in the back of this instruction manual. On every TDS decal there are also numbers on the left side of the decal descending vertically from 0 to 11. This series of numbers is called the grid line. Now suppose you are hunting an elk with a chest depth of 24 inches. To determine the range place the main horizontal crosshair on the top of the back at the shoulder area. Look to see where the bottom of the chest lines up in relation to the marker bars. Say in this case the bottom of the chest falls just slightly below the 3rd marker bar. Look at the decal to see what grid line number is at that same point where the bottom of the chest is. You will find that number 8 most closely corresponds. Take that 8 and divide it into the chest depth of 24 to get 3, multiply that 3 times 100 to get 300 yards away. Now use the 300 yard bar on the reticle and fire.

The TDS reticle can also compensate for trajectories fired at sharp angles say from 30 to 45 degrees. Most people have a tendency to shoot high in these situations. Bullet trajectories are figured over a horizontal plane. If you have a 500 yard shot at an animal the ballistics are pretty straightforward. If you have that same 500 yard shot at a 45 degree angle, up or down, the effect of gravity on the bullet will be over a much shorter distance. This is a case where most people will have a tendency to shoot too high. In this scenario with the TDS system you simply move from the 500 yard marker bar to the 400 yard marker bar.

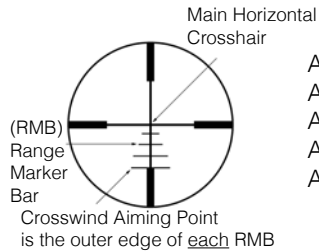
Factor Information

Swarovski Optik has a simple method that allows a shooter to match up his or her rifle / cartridge information to what the marker bars will indicate for yardage distances by first determining a "Factor Number". This factor number will be a number like 5.4, 6.2 or 8.7.

Once you know what your "Factor Number" is you can then match it up to one of the decals or stickers that are supplied with your TDS rifle scope. The "Factor Number" is the bullet's drop in inches, from 200 to 300 yards, with a 200 yard zero. Swarovski provides a "Factor" chart in the back of this manual for many popular calibers. If you can not find your cartridge in this chart there are several other ways to determine the proper factor. This factor number can also be found in many ammunition manufacturer's ballistic tables (either from catalogs or their internet sites), various ballistic programs, or by actually going out and shooting and measuring. You can also use the Swarovski Optik TDS Ballistic Calculator on www.swarovskioptik.com. Click on "products", "rifle scopes", then "Swarovski Optik TDS Ballistic Calculator" to determine your Factor Number. You must first type in your e-mail address and your rifle scope's serial number in the appropriate fields. There are also detailed instructions on this page of how the calculator works if you click on the pdf file "Description" in the lower left hand corner. This will then bring you to a screen called "Swarovski Optik Web Ballistics – Main Data Form". From here you enter the data for your individual cartridge or hand load. After the required data is entered click back to the Main Data Form. At the bottom of the second column you will now see your correct TDS Factor for your load. For example, your rifle is a 7mm Remington Magnum and you've decided you want to use Hornady's 154 grain InterBond load. The factory data will show that this bullet will drop 6.2 inches at 300 yards with a 200 yard zero. The TDS factor stickers have a "range" on them. In this case the 6.2 factor number falls between the range of Factors Decal 5.8-7.0. This will be the decal you will use for this cartridge and it will tell you what yardage the marker bars will mean. Most tend to put the decal right on the rifle's stock or on the objective bell of the scope for reference. This cartridge happens to call for a 200 yard zero because 200 is the highest yardage figure on the decal for the central crosshair. Keep in mind that if your zero distance is greater than 100 yards, you will be slightly high at 100 yards. If you need any help determining your factor number, call customer service at 1-800-426-3089.

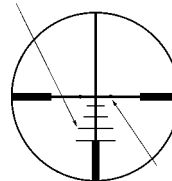
TDS Tri-Factor Reticle Components

TDS-Plex



Available in models
AV 3-9x36
AV 3-10x42, SR
AV 4-12x50, SR
AV 6-18x50

TDS-4



The two dots are the Lead - Aiming Point for a Running Boar Target @ 100 meters

Available in models
Z6 1.7-10x42, SR
Z6 2-12x50, SR
PH 4-16x50
PH 6-24x50

TDS-1i



Illuminated dot in center

Available in models
Z6i 1-7x42, SR
Z6i 2-12x50, SR
PVI-2 4-16x50
PVI-2 6-24x50

Although the zero on the main horizontal crosshair will not change regardless of power setting, you must select the highest power setting for each range marker bar to correspond to its distance on the decal. This is due to the fact that the reticle is mounted in the second image focal plane. As the power is turned down the marker bars will indicate further distances away.

Sighting in your Rifle

The most common method of sighting your TDS reticle is to sight dead on at the highest distance that is on the main crosshair of the "factor decal sticker" that is appropriate for the cartridge you are using. EX.) if your factor is 5.4 you will be using the decal "Factors 4.7-5.7". This decal shows 100, 200, 300 on the main crosshair. In this case you would sight in dead on at 300 yards, which will put you slightly high at 100 and 200 yards. If your factor is 8.7 you will be using the decal "Factors 8 to 9.5". This decal shows only 100 yards on the main crosshair so you would sight in at 100 yards using this factor range. The marker bar yardage distances according to your decal will fall into place using this method.

Swarovski Optik also offers you the "Swarovski Optik TDS Ballistic Calculator" on our website www.swarovskioptik.com. The calculator allows you to choose from many factory loads as well as to plug in your own data if you are a handloader. Once at the website's main page click on "products", then "rifle scopes", then "Swarovski Optik TDS Ballistic Calculator". You must enter your e-mail address and your rifle scope's serial number into the required fields. The serial number can be found on the bottom of the ocular bell of the scope or on the outside of the rifle scope box (the number will begin with a letter). There are also detailed instructions on how to use the ballistic calculator on this site by clicking on the pdf file "Description" in the lower left hand corner. Once the cartridge / load has been chosen the factor number will appear at the bottom of the middle column to let you know what decal to use. It will also tell you, to the exact yard, what every marker bar will indicate. You can also customize your settings by choosing different zeroes or power settings if desired. There are several blank decals included with your scope to use for customizing your settings. The most critical pieces of data are the velocity, ballistic coefficient and the zero yardage figures. This program defaults to a 200 yard zero. You have to change the zero yardage setting to your appropriate or desired zero distance so that the calculator can give exact marker bar distance readings.

If only a 100 yard range is available, sight in as follows; determine the bullet height at 100 yards if the gun was zeroed at the highest yardage listed on the decal for the center crosshair. Sight the gun in at 100 yards at that height above the bullseye. If you have a zero that is greater than 100 yards and need to know how high to sight in at 100 yards. Refer to ammunition charts, internet sites, ballistic programs or call customer service at 1-800-426-3089.

A word about super flat shooting calibers:

If your "Factor Number" is less than 4.7, Swarovski Optik does supply you with decals that require zeroes of 400 or 500 yards. These decals were designed with the idea that known shooting yardages would be between 400 and 900 yards. Although this system works very well it will cause mid-range trajectories between the muzzle and zero distance to be between 6 and 12 inches high. We suggest the following as an alternative where lower mid-range trajectories are desired. These values can be put on one of the blank stickers supplied with your scope.

*If your factor number falls between 4.3 to 4.6, zero the rifle at 250 yards. The marker bars will then be:

Marker Bar 1 – 350 yards
Marker Bar 2 – 500 yards
Marker Bar 3 – 650 yards
Marker Bar 4 – 800 yards

*If your factor number falls between 3.5 to 4.2, zero the rifle at 250 yards. The marker bars will then be:

Marker Bar 1 – 400 yards
Marker Bar 2 – 550 yards
Marker Bar 3 – 700 yards
Marker Bar 4 – 850 yards.

*These values were based upon the TDS-4 reticle, muzzle velocities in the 3400 to 3900 fps range, ballistic coefficients in the .430 to .550 range. You can always get the exact yardage figures by using the TDS Ballistic Calculator on our web site at www.swarovskioptik.com.

Ranging to a target

Muzzle Loaders note:

We have provided a 50 cal. Muzzle Loader factor sticker based upon a 100 yard zero, a muzzle velocity of about 1600 feet per second and a ballistic coefficient of about .180. The 4 marker bars will be 125, 150, 175 and 200 yards respectively. Since muzzle loading firearms are increasingly capable of faster muzzle velocities and ever changing bullets, we suggest entering your data into the TDS ballistic calculator on our website at www.swarovskioptik.com for the most accurate results.

Adjusting for Crosswind

Look at the four Range Marker Bars (RMB's) located just below the center horizontal reticle line. Note, the right and left end of each RMB is the aiming point that you are to use when adjusting for an approximate 10 mph. cross wind. If the wind is from the left, you should use the right tip of the wind bar as your aiming point, at the desired range and then "hold into the wind". If the wind is from the right, the opposite - left tip of the bar would become your aiming point. As before, always "hold in to the wind".

A 5 mph. crosswind, you would estimate half of the width of the RMB right or left of the center vertical reticle line.

A 20 mph. crosswind would require you to estimate double the width of the RMB, right or left of the center vertical reticle line.

In the Field - Putting it all together

Range, Wind and Angle with the TDS Reticle

The TDS Tri-Factor Reticle may also be used to determine the range to an animal at various distances. To do this you will need to first know the depth of the chest area of the game you are expecting to look at. Please refer to the Animal Silhouette Depth Chart table in the back of this brochure.

Procedure:

The following example uses a 30-06 rifle, firing a 165 grain bullet at 2800 fps factor number 8.7, to take a Bull Elk with a 24" Chest, standing at 300 yards in a 10 m.p.h. right to left cross wind at a 45° angle uphill incline. Please refer to the graphic diagrams, Figures #1, 2 and 3 and follow the following three steps.

Step A. Mount your rifle and locate your animal in the scope. Make sure the scope is on its maximum power. Measure the yardage to the target by sliding the crosshair to the top of its back at the shoulder area. Holding that position, drop your eyes down to the bottom of the chest. Determine where the bottom of the chest is in relation to the marker bars. Now look at the gridline on the left side of your TDS decal to see what gridline number matches up with the level of the bottom of the chest. (You will only see the gridlines on the decal. The gridlines will not appear in the rifle scope). In the example in figure 1 the bottom of the chest lines up just underneath the 3rd Marker Bar that will line up with the gridline # 8 on the decal. Now take that 8 and divide it into the known chest depth of 24 to get 3. Multiply 3.0 times 100 to get 300 yards as the distance to the target in this example.

2nd example: You're shooting a Couse deer with a known chest depth of 12". The bottom of the chest lines up with gridline 5. 5 divided into 12 equals 2.4. 2.4 times 100 equals 240 yards. In this case you would hold half way between the 200 and 300 yard Marker Bars.

Compensating for wind

Step B. You've determined the elk is 300 yards away but there is a 10 mph crosswind blowing from right to left. Slide the reticle up the animal's body centering the 300 yard range marker bar where you want the bullet to hit (BIP= bullet impact point). Maintaining elevation, slide the range marker bar to the right or into the wind until the left end of that marker bar is on the desired bullet impact point. (Fig. 2)

Compensating for angles

Step C. To correct for a 45 degree angle in this example simply move the from the 300 yard marker bar up to the 200 yard marker bar (see figure 3). The effect of gravity on a bullet at angles is less than that over flat horizontal planes. To give you a better understanding of this effect consider that this 30 cal 165 grain bullet at 2800 fps with a 100 yard zero drops 14.4 inches at 300 yards over a horizontal flat plane. Changing only the angle of the shot to 45 degrees, up or down, over the same 300 yard distance, the bullet drops only 7.3 inches.

With a minimum amount of practice, this whole procedure can be accomplished in about 3 to 5 seconds.

Fig 1.

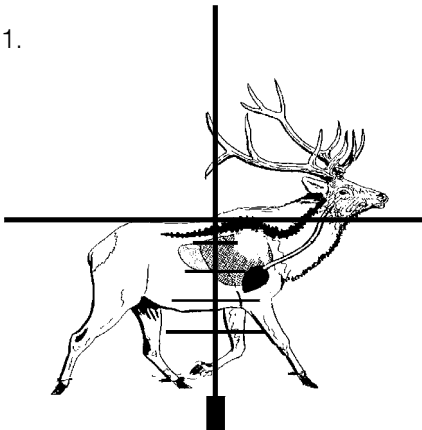


Fig 2.

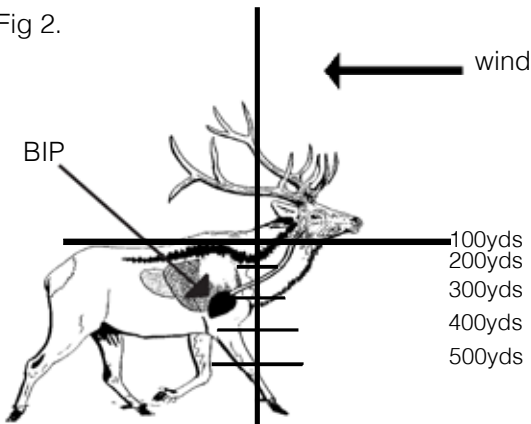
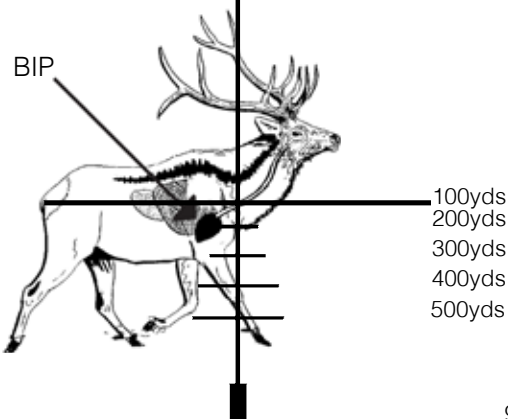
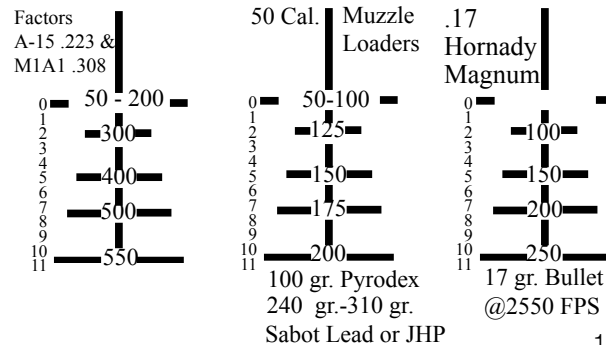
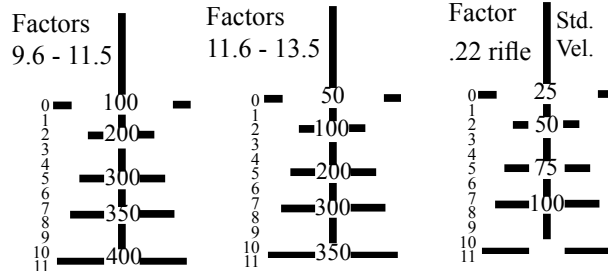
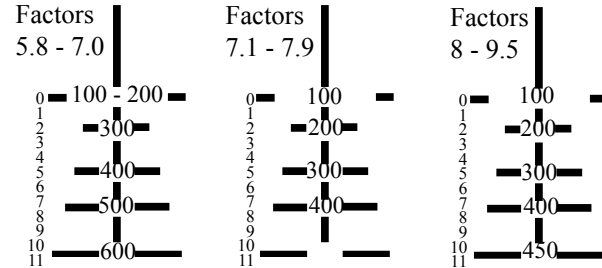
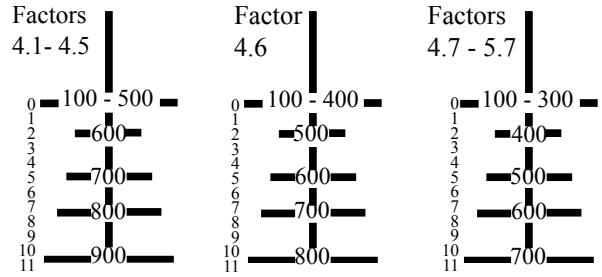


Fig. 3



TDS TRI- FACTOR DECALS

Included in product box



Animal Silhouette Depth Chart

Notes

Animal	Chest	Animal	Chest
Black Bear	18"	Gazelle	11-14"
Brown Bear	30	Mtn. Goat	22-24
Grizzly Bear	25	Ibex, Bezoar, Pasang	18
Polar Bear	25	Persian Ibex	19
Blackbuck	12	Siberian Ibex	24
Blesbok	20	Impala	14
European Boar	21	Moose	36-42
Peccary Boar	12	Mtn. Lion	10-12
Warthog Boar	18	Mule Deer	22
Cape Buffalo	36	Nilgai	28-30
Bison Buffalo	50	Nyala	25
Asiatic Buffalo	36	Pronghorn	16
Bushbuck	10-15	Reedbuck	12
Caribou	25	Marco Polo Sheep	24
Coyote	12	Big Horn Sheep	23
Axis Deer	17-19	Stone Sheep	22
Eland	38	Dall Sheep	21
Roosevelt Elk	31-33	Steinbok	12
(cow)	24	Himalayan Tahr	28
Manitoba Elk	26-28	Waterbuck	19-26
(cow)	22	Whitetail Deer	
Rocky Mt. Elk	24-28	Northern	22
(cow)	20	Texas	15
Tule Elk	21-23	Coes	12
(cow)	19	Wolf	15-18

Caliber	Mfg.	Bullet Weight	Bullet Style	MV Factor	Point of Impact	Caliber	Mfg.	Bullet Weight	Bullet Style	MV	Factor	In. above or below target bullseye*	
17 Horn. Mag. RF	Horn.	17gr.	V-Max	2550	□	0							
223 Rem.	Fed.	55gr	Sierra BTHP	3240	8	-0.5							
223 Rem.	Win	50gr	Bal. Silvertip	3410	6.4	1.2							
223 Rem.	Rem.	62gr	HP Match	3025	9.4	-0.1							
223WSSM	Win.	64gr	Power Pt.	3600	5.7	2.9							
22-250 Rem.	Rem.	50gr	V-Max	3725	5.1	2.6	300 WSM	Win.	150gr.	Ball. Silvertip	3300	5.4	2.9
22-250 Rem.	Win.	55gr	Bal. Silvertip	3680	5	2.6	300 WSM	Win.	180gr.	Fail-Safe	2970	7	1.6
22-250 Rem.	Fed.	40gr	Sierra VHP	4000	5.6	2.4	300 RSAUM	Rem.	165gr.	PSP Core Lokt.	3075	7	1.5
243 Win.	Win.	80gr	Pointed SP	3350	6.5	1.3	300 RSAUM	Rem.	180gr.	Nos. Partition	2960	6.8	1.5
243 Win.	Fed.	100gr	Nos. Partition.	2960	7.1	-0.4	30-378 Wby.	Wby.	165gr.	Nos. Ball. Tip	3500	4.6	4.2
243 Win.	Horn.LM	95gr	SST	3100	6.6	1.3	30-378 Wby.	Wby.	180gr.	Barnes-X	3450	4.7	2.5
243 WSSM	Win.	95gr	Bal. Silvertip	3250	5.7	3.2	30-378 Wby.	Wby.	200gr.	Nos. Partition	3160	5.8	1.2
243 WSSM	Win.	100gr	Power Pt.	3110	6.6	1.4	300-Rem.-Ultr_mag.	Rem.	180gr.	Swift Scirocco	3250	5.3	2.9
25-06 Rem.	Fed.	100gr	Nosler-Bal Tip	3210	6.8	1.5	300-Rem.-Ultr_mag.	Rem.	200gr.	Nos. Partition	3025	6.4	1.4
25-06 Rem.	Horn.	117gr	SST	2990	6.9	1.4	338 Win. Mag.	Win.	230gr.	Fail-Safe	2780	8.1	-0.1
257 Wby. Mag.	Wby.	87gr.	Soft Point	3825	4.2	6.0	338-378 Wby.	Wby.	200gr.	Nos. Ball. Tip	3350	5.3	2.8
257 Wby. Mag.	Wby.	115gr	Nosler-Bal. Tip	3400	5	3.0	338-378 Wby.	Wby.	250gr.	Nos. Partition	3060	6.3	1.4
257 Wby. Mag.	Wby.	120gr	Nos. Partition	3305	5.6	3	338 Rem UM	Rem.	250gr.	Swift-Aframe	2860	7.6	-0.3
270 Win.	Win.	130gr	Bal. Silvertip	3050	6.5	1.4	375 H&H	Fed.	250gr.	TB Bear Claw	2670	10.4	0.4
270 Win.	Rem.	140gr	PSP Core-Lokt	2925	7.6	-0.3	275 Roberts	Rem.	117gr.	SP Core Lokt.	2650	11.7	0
270 Win.	Fed.	150gr	Nos. Partition	2850	7.5	-0.3	7MM Mauer	Fed.	175gr.	Hi Shok SPRN	2440	13.3	0
270 WSM	Win.	130gr	Bal. Sivertip	3275	5.5	3	308 Win.	Rem.	180gr.	SP Core Lokt.	2620	11.8	0
270 WSM	Win.	150gr	Power Pt.	3150	6.5	1.4	30-06 Spr.	Fed.	220gr.	Speer Hot-Cor SP	2410	13.1	0
270 Wby. Mag.	Wby.	140gr	Nos. Bal. Tip	3300	5.3	2.9	17 Horn. Mag. RF	Horn.	17gr.	V-Max	2550	□	0
270 Wby. Mag.	Wby.	150gr	Nos. Partition	3245	5.5	3							
7mm-08 Rem.	Horn.LM	139gr	SST	3000	6.6	1.5							
7mm-08 Rem.	Fed.	140gr	Nos. Partition	2800	8	-0.2							
280 Rem.	Rem.	150gr	PSP Core-Lokt	2890	8	-0.2							
280 Rem.	Win.	140gr	Fail-Safe	3050	7.2	-0.5							
7MM-Rem. Mag.	Rem.	140gr	PSP Core-Lokt	3175	6	1.3							
7MM-Rem. Mag.	Fed.	150gr	Sierra Gm. King	3110	5.9	1.3							
7MM-Rem. Mag.	Horn.	162gr	SST	2940	6.5	1.4							
7MM Wby. Mag.	Wby.	140gr	Nos. Partition	3303	5.4	2.9							
7MM Wby. Mag.	Wby.	150gr	Barnes-X	3100	6.1	1.3							
7MM-STW	Win.	140gr	Bal. Silvertip	3300	5.1	2.8							
7MM-STW	Fed.	160gr	Sierra Gm. King	3200	5.5	3.1							
7MM-WSM	Win.	140gr	Bal. Silvertip	3225	5.6	3							
7MM-RSAUM	Rem.	160gr	Nos. Partrition	2960	6.8	1.5							
7MM-Rem-UltraMag	Rem.	140gr	Nos. Partition	3425	4.9	2.6							
308 Win.	Fed.	150gr	Nos. Bal. Tip	2820	8.9	0.1	257 Roberts	Rem.	117gr.	SP Core Lokt.	2650	11.7	0
308 Win.	Rem.	165gr	Swift Scirocco	2700	8.4	0	7MM Mauer	Fed.	175gr.	Hi Shok SPRN	2440	13.3	0
308 Win.	Win.	180gr	Silvertip	2620	9.9	0.6	308 Win.	Rem.	180gr.	SP Core Lokt.	2620	11.8	0
30-06 Spr.	Horn.	150gr	BTSP	2910	8	0	30-06 Spr.	Fed.	220gr.	Speer Hot-Cor SP	2410	13.1	0
30-06 Spr.	Fed.	165gr	TB Bear Claw	2800	8.7	0							
30-06 Spr.	Rem.	180gr	Swift A-Frame	2700	9.1	0.1							
300 Win. Mag.	Win.	150gr	Fail-Safe	3260	6.2	1.3							
300 Win. Mag.	Win.	165gr	Fail-Safe	3120	7	1.5							
300 Win. Mag.	Fed.	180gr	Nos. Partition	2960	7.5	-0.4							
300 Win. Mag.	Fed.	200gr	Sierra-Gm. King	2830	7.1	-0.3							
300 Wby. Mag.	Wby.	150gr	Nos. Partition	3540	4.7	2.5							
300 Wby. Mag.	Wby.	180gr.	Nos Partition	3240	5.5	3.0							

* Inches above or below(-) target bullseye for 100 yard sight-in with center crosshair.

Factors 11.6 - 13.5

Caliber	Mfg.	Bullet Weight	Bullet Style	MV	Factor	50 Yard Zero**
257 Roberts	Rem.	117gr.	SP Core Lokt.	2650	11.7	0
7MM Mauer	Fed.	175gr.	Hi Shok SPRN	2440	13.3	0
308 Win.	Rem.	180gr.	SP Core Lokt.	2620	11.8	0
30-06 Spr.	Fed.	220gr.	Speer Hot-Cor SP	2410	13.1	0

** Inches above or below(-) target bullseye for 50 yard sight-in with center crosshair.

These charts were compiled for some of the more popular calibers. If you do not find your specific load please refer to the published ammunition manufacturers' Ballistic Charts, either in print or online. If your ammunition chart shows a 200 yard zero, refer to the bullet drop at 300 yards. This number is the factor for your ammunition. If you have any other questions regarding sighting in your TDS reticle please call 800-426-3089.

* Inches above or below(-) target bullseye for 100 yard sight-in with center crosshair.

□ See 17 specific decal.