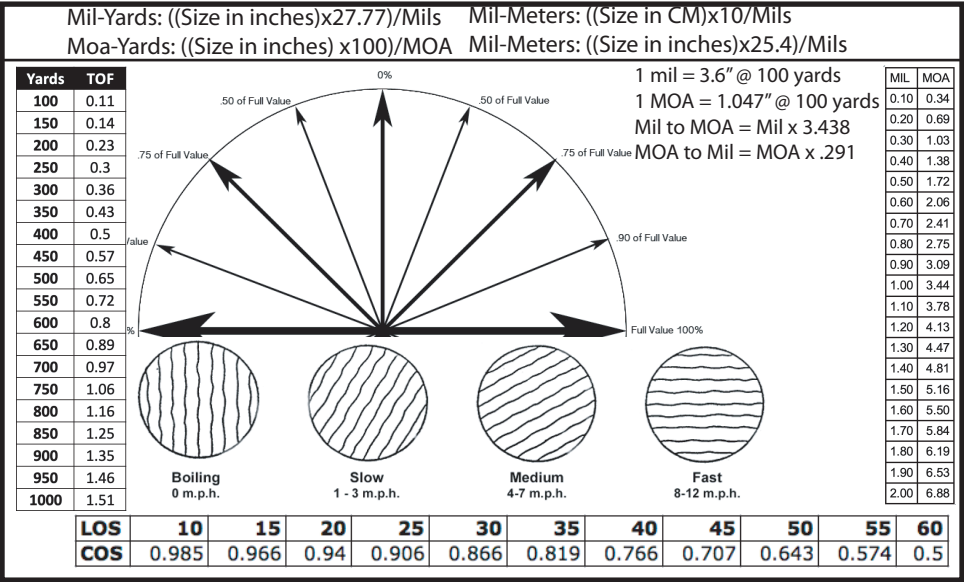


General Reference Info: Range formulas, Mil to MOA, Wind, Angled Fire, Generic Mover info. LOS/COS is line of sight angle and cosine, multiply cosine by range for corrected range used for elevation. Yards/TOF is time of flight for movers.



Mil Ranging Card: Target size in inches on left. Measured target in mils. Corresponding answer is range in yards to target.

	< Target Size Inches Target Size - Mils Mil-Yards: ((Size in inches)x27.77)/Mils																							
	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5			
8	444	370	317	278	247	222	202	185	171	159	148	139	131	123	117	111	106	101	97	93	89			
10	555	463	397	347	309	278	252	231	214	198	185	174	163	154	146	139	132	126	121	116	111			
12	666	555	476	417	370	333	303	278	256	238	222	208	196	185	175	167	159	151	145	139	133			
16	889	741	635	555	494	444	404	370	342	317	296	278	261	247	234	222	212	202	193	185	178			
18	1000	833	714	625	555	500	454	417	385	357	333	312	294	278	263	250	238	227	217	208	200			
20	1111	926	793	694	617	555	505	463	427	397	370	347	327	309	292	278	264	252	241	231	222			
24	1333	1111	952	833	741	666	606	555	513	476	444	417	392	370	351	333	317	303	290	278	267			
	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0			
30	833	757	694	641	595	555	521	490	463	438	417	397	379	362	347	333	320	309	298	287	278			
36	1000	909	833	769	714	666	625	588	555	526	500	476	454	435	417	400	385	370	357	345	333			
48	1333	1212	1111	1025	952	889	833	784	741	702	666	635	606	580	555	533	513	494	476	460	444			
54	1500	1363	1250	1154	1071	1000	937	882	833	789	750	714	682	652	625	600	577	555	536	517	500			
	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0			
70	972	926	884	845	810	778	748	720	694	670	648	627	607	589	572	555	540	525	512	498	486			

Shooter Checklists/Reference Info

Positional Checklist

Square hips to target

Center rifle

Cheek weld

Shooting hand

Shooting elbow

Non shooting elbow

Non shooting hand

Legs

Torque Values:

Rifle Base - 15 in lbs

Rings to base - 55 in lbs

Scope rings - 20 in lbs

Action Screw, B14 - 55in lbs

Action Screw, CZ - 25 in lbs

Mlok - 35in lbs

Barrel Nut - 55 ft/lbs

Handguards - 25-30 in lbs

Shooter's Checklist

Pan to target

Parallax

Range & Elevation

Magnification

Close Bolt

Check level

90 Degrees of trigger

Final wind call

Breath

Good trigger press

Recoil management

Measure Impact

Make Call-> MPH wind

Shot

-Atmospherics

-Baro, Temp, H

-Range->Elevation

-Wind Direction

-Wind Speed

Quick Dope

Drop: 100's of yards - Constant=Mils

500yd = 5-2.0=3.0 mils

Wind: MPH Gun/G1 BC Gun

4mph gun = 0.5mil @ 500 @ 4

Additional Considerations @1000+

Spin Drift

-0.1 mil R every 400 yards

Coriolis

-DOF = Elevation. E+,W-

-Latitude = Windage. N /R, S/L

Truing

Mach 1.2-1340 FPS

Sub-200 yards past

Process

-Zero

-Chrono

-Trans

-Slide BC

-Confirm Mid Range & Sub DSF

Movers

Mils per second x TOF = Hold

5mil/s x 0.8tof = 4 Mil Hold

V2, .5 mil per MPH. 1 mil/sec=1 mph

Density Altitude Chart. Find your elevation in ft, and temp in F. Corresponding number is Density Altitude

14,000'	12500	13500	14000	14500	15500	16000	16500	17500	18000																		
13,000'	11,500	12,000	13,000	13,500	14,000	15,000	15,500	16,000	17,000	17,500																	
12,000'	10,000	11,000	11,500	12,500	13,000	13,500	14,000	15,000	15,500	16,000	17,000																
11,000'	9,000	9,500	10,500	11,000	11,500	12,500	13,000	13,500	14,500	15,000	15,500	16,500															
10,000'	7,500	8,500	9,000	10,000	10,500	11,000	12,000	12,500	13,000	14,000	14,500	15,000	16,000	16,500													
9,000'	6,500	7,000	8,000	8,500	9,500	10,000	10,500	11,000	12,000	12,500	13,500	14,000	14,500	15,500													
8,000'	5,000	6,000	6,500	7,500	8,000	8,500	9,500	10,000	10,500	11,500	12,000	12,500	13,500	14,000													
7,000'	4,000	4,500	5,500	6,000	7,000	7,500	8,000	9,000	9,500	10,000	11,000	11,500	12,500	13,000													
6,000'	2,500	3,500	4,000	5,000	5,500	6,000	7,000	7,500	8,000	9,000	9,500	10,500	11,000	12,000													
5,000'	1,500	2,000	3,000	3,500	4,500	5,000	5,500	6,500	7,000	7,500	8,500	9,000	10,000	10,500													
4,000'	0	1,000	1,500	2,500	3,000	3,500	4,500	5,000	6,000	6,500	7,000	8,000	8,500	9,500													
3,000'	-1,000	-500	500	1,000	2,000	2,500	3,000	4,000	4,500	5,500	6,000	6,500	7,500	8,000													
2,000'	-2,500	-1,500	-1,000	0	500	1,500	2,000	2,500	3,500	4,000	4,500	5,500	6,000	7,000													
1,000'	-3,500	-3,000	-2,000	-1,500	-500	0	500	1,500	2,000	3,000	3,500	4,000	5,000	5,500													
0'	-5,000	-4,000	-3,500	-2,500	-2,000	-1,000	-500	0	1,000	1,500	2,500	3,000	3,500	4,500													
	-10F	0F	10F	20F	30F	40F	50F	60F	70F	80F	90F	100F	110F	120F													

Gun Backup Reference Cards: Gun, Bullet, your trued BC or Drop Scale Factor based on valid trajectories, Muzzle velocity, and Height Over Bore

[illegible][illegible]

Load Shift/Suppressor Shift tracking cards. Gun and Load/bullet, suppressed or not, and impact low high, impact left/right. Some ammo won't shoot the same as your main zero, track it in these cards

[illegible][illegible]

Data Confirmation/Data Truing Cards: Input variables up top until True BC, leave blank. Input range, elevation, and wind. Shoot at distances, hopefully near mach 1.2. Observe impacts, write down actual or observed impacts at ranges. True your BC in the calculator until calculator lines up with observed drop. Run calculator with new BC. Write down new elevation numbers at distance, and confirm data with live fire. You're trued up!

[illegible][illegible][illegible][illegible]

Mover calculator based on Mils/Second. Filled with generic 6.5 Creedmoor info.
Update TOF info in excel file in shared folder. Measure mover in Mils per second in reticle. Correlate with range, and hold value in chart. No need to convert to MPH.

		Mph			Mover in Mils/Second					Gun: HMR					Bullet: 140 BTHP					MV: 2625						
Yds	tof	3.1	6.1	8.2	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10		
100	0.117	1.8	3.5	4.7	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.8	0.8	0.9	0.9	1.0	1.1	1.1	1.2		
200	0.241	1.8	3.6	4.8	0.1	0.2	0.4	0.5	0.6	0.7	0.8	1.0	1.1	1.2	1.3	1.4	1.6	1.7	1.8	1.9	2.0	2.2	2.3	2.4		
300	0.373	1.9	3.7	5.0	0.2	0.4	0.6	0.7	0.9	1.1	1.3	1.5	1.7	1.9	2.1	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.5	3.7		
400	0.512	1.9	3.8	5.1	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.6	2.8	3.1	3.3	3.6	3.8	4.1	4.4	4.6	4.9	5.1		
500	0.66	2.0	3.9	5.3	0.3	0.7	1.0	1.3	1.7	2.0	2.3	2.6	3.0	3.3	3.6	4.0	4.3	4.6	5.0	5.3	5.6	5.9	6.3	6.6		
550	0.738	2.0	4.0	5.4	0.4	0.7	1.1	1.5	1.8	2.2	2.6	3.0	3.3	3.7	4.1	4.4	4.8	5.2	5.5	5.9	6.3	6.6	7.0	7.4		
600	0.818	2.1	4.1	5.5	0.4	0.8	1.2	1.6	2.0	2.5	2.9	3.3	3.7	4.1	4.5	4.9	5.3	5.7	6.1	6.5	7.0	7.4	7.8	8.2		
650	0.9	2.1	4.1	5.6	0.5	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	4.5	5.0	5.4	5.9	6.3	6.8	7.2	7.7	8.1	8.6	9.0		
700	0.986	2.1	4.2	5.6	0.5	1.0	1.5	2.0	2.5	3.0	3.5	3.9	4.4	4.9	5.4	5.9	6.4	6.9	7.4	7.9	8.4	8.9	9.4	9.9		
750	1.074	2.2	4.3	5.7	0.5	1.1	1.6	2.1	2.7	3.2	3.8	4.3	4.8	5.4	5.9	6.4	7.0	7.5	8.1	8.6	9.1	9.7	10.2	10.7		
800	1.165	2.2	4.3	5.8	0.6	1.2	1.7	2.3	2.9	3.5	4.1	4.7	5.2	5.8	6.4	7.0	7.6	8.2	8.7	9.3	9.9	10.5	11.1	11.7		
850	1.259	2.2	4.4	5.9	0.6	1.3	1.9	2.5	3.1	3.8	4.4	5.0	5.7	6.3	6.9	7.6	8.2	8.8	9.4	10.1	10.7	11.3	12.0	12.6		
900	1.357	2.3	4.5	6.0	0.7	1.4	2.0	2.7	3.4	4.1	4.7	5.4	6.1	6.8	7.5	8.1	8.8	9.5	10.2	10.9	11.5	12.2	12.9	13.6		
950	1.459	2.3	4.6	6.2	0.7	1.5	2.2	2.9	3.6	4.4	5.1	5.8	6.6	7.3	8.0	8.8	9.5	10.2	10.9	11.7	12.4	13.1	13.9	14.6		
1000	1.564	2.4	4.7	6.3	0.8	1.6	2.3	3.1	3.9	4.7	5.5	6.3	7.0	7.8	8.6	9.4	10.2	10.9	11.7	12.5	13.3	14.1	14.9	15.6		

MPH Of Movers Chart. For those who want to convert to MPH. Measure mover in Mils/Second, find in chart for range measured. Column is your MPH of target.

MPH of mover chart. Measure target in mils/second. find in chart. Header is MPH.										
Yards	1	2	3	4	5	6	7	8	9	10
100	4.9	9.8	14.7	19.6	24.4	29.3	34.2	39.1	44.0	48.9
150	3.3	6.5	9.8	13.0	16.3	19.6	22.8	26.1	29.3	32.6
200	2.4	4.9	7.3	9.8	12.2	14.7	17.1	19.6	22.0	24.4
250	2.0	3.9	5.9	7.8	9.8	11.7	13.7	15.6	17.6	19.6
300	1.6	3.3	4.9	6.5	8.1	9.8	11.4	13.0	14.7	16.3
350	1.4	2.8	4.2	5.6	7.0	8.4	9.8	11.2	12.6	14.0
400	1.2	2.4	3.7	4.9	6.1	7.3	8.6	9.8	11.0	12.2
450	1.1	2.2	3.3	4.3	5.4	6.5	7.6	8.7	9.8	10.9
500	1.0	2.0	2.9	3.9	4.9	5.9	6.8	7.8	8.8	9.8
550	0.9	1.8	2.7	3.6	4.4	5.3	6.2	7.1	8.0	8.9
600	0.8	1.6	2.4	3.3	4.1	4.9	5.7	6.5	7.3	8.1
650	0.8	1.5	2.3	3.0	3.8	4.5	5.3	6.0	6.8	7.5
700	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0
750	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.2	5.9	6.5
800	0.6	1.2	1.8	2.4	3.1	3.7	4.3	4.9	5.5	6.1
850	0.6	1.2	1.7	2.3	2.9	3.5	4.0	4.6	5.2	5.8
900	0.5	1.1	1.6	2.2	2.7	3.3	3.8	4.3	4.9	5.4
950	0.5	1.0	1.5	2.1	2.6	3.1	3.6	4.1	4.6	5.1
1000	0.5	1.0	1.5	2.0	2.4	2.9	3.4	3.9	4.4	4.9

DA Based Drop Charts Pre Filled for range

Gun:	Bullet:	MV:	BC:	Wind:	DA:
150		625		860	
200		650		880	
250		675		900	
300		700		920	
350		725		940	
400		750		960	
450		775		980	
500		800		1,000	
550		820		1,020	
600		840		1,040	

Gun:	Bullet:	MV:	BC:	Wind:	DA:
150		625		860	
200		650		880	
250		675		900	
300		700		920	
350		725		940	
400		750		960	
450		775		980	
500		800		1,000	
550		820		1,020	
600		840		1,040	

Gun:	Bullet:	MV:	BC:	Wind:	DA:
150		625		860	
200		650		880	
250		675		900	
300		700		920	
350		725		940	
400		750		960	
450		775		980	
500		800		1,000	
550		820		1,020	
600		840		1,040	

Gun:	Bullet:	MV:	BC:	Wind:	DA:
150		625		860	
200		650		880	
250		675		900	
300		700		920	
350		725		940	
400		750		960	
450		775		980	
500		800		1,000	
550		820		1,020	
600		840		1,040	