The Los Angeles Silhouette Club

Ballistic Formulas / Conversion Tables / Notes

Loads Per Pound of Powder

5 gr. = 1400	40 gr. = 175	75 gr. = 93
10 gr. = 700	45 gr. = 155	80 gr. = 87
15 gr. = 466	50 gr. = 140	85 gr. = 82
20 gr. = 350	55 gr. = 127	90 gr. = 77
25 gr. = 280	60 gr. = 116	95 gr. = 73
30 gr. = 233	65 gr. = 107	100 gr. = 70
35 gr. = 200	70 gr. = 100	

Weight / Length Equivalents

7000 Grains	=	1 Pound
437.5 Grains	=	1 Ounce
15.43 Grains	=	1 Gram
25.4 Millimeters	=	1 Inch

Conversion Factors

Pounds	x 7000	=	Grains
Ounces	x 437.5	=	Grains
Grains	x .00229	=	Ounces
Grams	x15.4324	=	Grains
Grains	x .0648	=	Grams
Inches	x 25.4	=	Millimeters
Millimeters	x .03937	=	Inches

Common Abbreviations

ACP > Automatic Colt Pistol	**HP** > Hollow Point	**R/RB** > Round Ball
AV > Average Velocity	**HPBT** > Hollow Point Boat Tail	**RF** > Rim Fire
BB > Bevel Base	**HS** > Hydra Shok HP (Federal)	**RN** > Round Nose
BBWC > Bevel Base Wadcutter	**J** > Jacketed Bullet	**SAA** > Single Action Army
BC > Ballistic Coefficient	**JHC** > Jacketed Hollow Core/Cavity	**SD** > Sectional Density or Standard Deviation
BP > Bullet Pull		
BPS > Black Powder Sil.	**JFP** > Jacketed Flat Point	**SIL** > Silhouette
BR > Bench Rest	**JHP** > Jacketed Hollow Point	**SJ** > Short Jacket
BT > Boat Tail	**KEITH** > Elmer Keith Bullet Design	**SP** > Spire Point / Soft Point
CAV > Cavalry	**L/LB** > Lead Bullet	**SWC** > Semi-Wadcutter
CB > Cast Bullet	**LBT** > Lead Bullet Technology	**SSP** > Single Shot Pistol
CF > Center Fire	**LD** > Loading Density	**TC** > Truncated Cone
CV > Coefficient / Variation	**LOS** > Line of Sight	**T/C** > Thompson Center Arms
CUP > Copper Units of Press.	**LRN** > Lead Round Nose	**TMJ** > Total Metal Jacket
DCM > Dir. Civilian Marksmanship	**MC** > Metal Case	**TOF** > Time of Flight
FMJ > Full Metal Jacket	**ME** > Muzzle Energy	**WC** > Wadcutter
FN > Flat Nose	**MOA** > Minute of Angle	**WCF** > Winchester Center Fire
FP > Flat Point	**MR** > Mean Radius	**WLN** > Wide Long Nose (LBT bullet design)
FPS > Feet Per Second	**MV** > Muzzle Velocity	**XTP** > Extreme Terminal Performance, (Hornady jacketed hollow point)
GC > Gas Check	**NSS** > North-South Skirmish	
HBWC > Hollow Base WC	**OAL** > Over All Length	
HJ > Half Jacket	**PSI** > Pounds Per Square Inch	

Greenhill Formula

The formula to determine the correct rate of rifling pitch for bullets of usual construction (lead alloy or jacketed) is known as the "Greenhill Formula".

Step One:	Determine the length of the bullet in calibers. (Bullets length in inches divided by the bullets nominal caliber).
Step Two:	Divide 150 (a constant) by the bullets length in calibers.
Step Three:	Multiply the result of step two by the bullets "nominal" caliber. This will give the desired rifling twist rate.

Example: To find the correct twist for a .30 caliber 220 grain bullet 1.35 inches long.

$$\frac{1.35}{.30} = 4.5 \text{ calibers} \qquad \frac{150}{4.5} = 33.33$$

33.33 x .30 = 9.999
(or 1 in 10 inch twist)

Associations / Organizations Abbreviations

CBA	>	Cast Bullet Association
CCA	>	Colt Collectors Association
IHMSA	>	International Handgun Metallic Silhouette Association
IPSC	>	International Practical Shooting Association
NBRSA	>	National Bench Rest Shooters Association
NRA	>	National Rifle Association
NRMA	>	National Reloading Manufacturers' Association
NSSF	>	National Shooting Sports Foundation
SAAMI	>	Small Arms and Ammunition Manufacturers Institute
SASS	>	Single Action Shooters Society

Is Your Range In Meters Or Yards?

Multiply

Yards	By	0.9144	To get	**Meters**
Meters	By	1.094	To get	**Yards**
FPS	By	0.3048	To get	**MPS**
MPS	By	3.281	To get	**FPS**
FPS	By	0.6818	To get	**MPH**

Abbreviations

FPS	=	Feet Per Second
MPS	=	Meters Per Second
MPH	=	Miles Per Hour

Muzzle Energy

Weight of bullet (in grains) x velocity (in foot seconds) x velocity x 0.000002218 = energy in foot pounds.

Example: 100 grain bullet at 3000 ft/seconds > **100 x 3000 x 3000 x 0.000002218 = 1996 foot pounds**

Momentum In Pound Seconds

Multiply the bullet weight in grains by the velocity at impact. Divide the product by 226,000 (a gravimetric Constant).

Example: 45 caliber 240 grain bullet 200 yard velocity of 985 fps. **240 x 985 = 236400 divided by 226,000 = 1.046 pound-seconds momentum**

Standard Deviation

Example: 5 shot string, velocity's of 1020, 980, 1000, 1015, 985. First, add the five velocity's and take their average: 1020, 980, 1000, 1015, 985

The five velocity's add up to 5000 fps. Their average is 1,000 fps (5000/5) Next subtract the average from each velocity and square the difference. Add up the squared differences (1250) and divide by 4 (the number of velocity's minus one).

Always divide the number of measurements minus one. The result is 312.5 or 17.68: (17.68 x 17.68 = 312.5).

Coefficient of Variation

The coefficient of Variation shows the standard deviation as a percent of the average and is a more reliable measure of a loads consistency.

The smaller the CV the less variation there is "relative to the average". Divide the average into the standard deviation and multiply the result by 100. From the above example of standard deviation: The S.D. is 17.68. The average is 1000.

Example: 17.68 (SD) divided by 1000 (velocity) = 0.01768 x 100 = 1.768. The CV is 1.768.

Sectional Density

The formula for SD is: SD = WG /7000 x D^2

Where WG is weight is in grains and D is is the bullets diameter in inches.

Example: For a 180 grain .30 caliber bullet, SD = 180/7000 x .308 squared. Divide the bullets weight in grains (180) by the number of grains in a pound (7000), which yields .2571428. Next square the bullets caliber in inches (.308 x .308) which gives .094864 and divide into .2571428 which yields .2710638. This rounds off to an SD of .271.

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