

A Brief History of .50 Browning Machine Gun Cartridge Development

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Initial Development :

Tradition has it that the cartridge that was to become the .50 BMG we know today, was initiated at the personal request of General John (Blackjack) Pershing. This request for a heavy machine gun cartridge came in light of American experiences with the large-caliber weapons employed by the European nations during WW1. The request, in April 1918, for a weapon with an effective range of 6,000 meters and a muzzle velocity of 2600 fps was contracted to the Winchester Repeating Arms Company. The proposed cartridge was to have both machine gun and anti-tank capabilities.(1)

Later that same month, Winchester began the fabrication of test cartridges to obtain ballistic data. Initially they used 16-gauge, brass shotshells, necked down to accept commercial 500-grain lead 45-70 projectiles. Propellant charges used varied from 120-150 grains, developing 2485 to 2944 fps muzzle velocity, and generated a (probably wildly overestimated) breech pressure of 90,000 psi(1) !! (Compare that to the pressures developed in the current cartridges on the chart above.)

In late 1918, work on the cartridge was transferred from Winchester to Frankford Arsenal, where it remained (almost exclusively) until well into WW2.(1) Design work on the weapon itself was performed by John Browning and Colt.(6)

During the ensuing years of development, the cartridge case design went through a series of metamorphoses. Case lengths from 4.08 inches to 3.80 inches were tried. Rimmed, semi-rimmed, and rimless case designs were considered. Both the 13mm German anti-tank round and a scaled-up 30-06 cartridge design were copied, with the latter finally winning approval. Projectile weights from 800 to 508 grains were tested. And cartridge overall lengths from 5.51 to 5.00 inches were explored.(1) (Compare with the stats listed in the chart above.)

Eventually, advances in tank armor outpaced that of anti-tank rifles, so the .50 BMG became, exclusively, a heavy machine gun caliber cartridge. The first machine gun was standardized as the M1921 and,(6) in 1924, the Caliber .50 Browning Machine Gun Cartridge was adopted in the form pretty much as we know it still today.(1)

Development Takes Off :

The onset of WW2 initiated a surge in development of the caliber and many design concepts were investigated just prior to, during, and well after the war. Loadings tried, at one time or another over the decades, include Ball, Blank, Grenade Blank, Dummy, Proof, Tracer (numerous variations !), Incendiary, Explosive, Shot, Frangible, Match, Hollow-Point, Tear Gas, Spotter (Observation), Armor Plate Test, Armor Piercing, Limited-Range Training, Short-Range Training, Limited-Range Training-Tracer, Short-Range Training-Tracer, Armor Piercing-Incendiary, Armor Piercing-Tracer, Armor Piercing-Tear Gas, Armor Piercing-Explosive, Armor Piercing-Incendiary-Tracer, Explosive-Incendiary, Explosive-Tear Gas, Incendiary-Tracer, Hi Explosive-Incendiary-Armor Piercing ("Multi-Purpose"), Hi Explosive-Incendiary-Armor Piercing-Tracer ("Multi-Purpose-Tracer"), (Plastic) Practice, (Plastic) Practice-Tracer, Flechette, Armor Piercing-Discarding Sabot, Armor Piercing-Discarding Sabot-Tracer, Caseless, Telescoped, "Folded," Lockless, Gyrojet, "Taper-Bore," "Triplex," Bio-Chem Warfare, etc.

It was during the 1930's that the problems of cracked case necks were cured by heat annealing. During the WW2 years, case mouth and primer sealants were introduced, to increase cartridge shelf life. In 1949 non-corrosive primer compounds were initiated. (Although the last plant didn't convert to non-corrosive until 1954.)(5) And in 1950, the troubles of tracer deterioration were reduced by the use of a projectile base sealing cap of metal foil or plastic.(7)

Since .50 BMG cartridge inception, projectile materials tested and either seriously considered or adopted have included: plastic, steel, copper, aluminum, brass, bronze, depleted uranium and various alloys too numerous to mention. The same could be said for cartridge case materials. These have included: steel, brass, aluminum, plastic, and various alloys too numerous to mention.

Through the decades, there have been metal cases with metal bullets, plastic cases with plastic bullets, plastic cases with metal bullets, metal cases with plastic bullets, and even metal cases with plastic AND metal bullets !!

Research and development on the .50 BMG caliber cartridge continues even today. Some of the latest (just within the last 10 years and just for USGI use) include : The M903 SLAP and M962 SLAP-T (see VHP Issue 1995 #4 for details), the Mk 211 MP (refer to VHP Issues 1993 #4 and 1994 #4), the newly redesigned M17 Tracer (see VHP 1997 #4 for details of this and the new tip color codes), the M858 Practice and M862 Practice Tracer (consult an upcoming issue of VHP), and some new designs whose details still remain confidential. (watch for a future VHP article when the security wraps are removed.)

.50 BMG Cartridge Case Headstamps (US Manufacturer Codes) (4)

FA	Frankford Arsenal, Philadelphia PA
DM	Des Moines Ordnance Plant, Des Moines IA
KS	Kelly Springfield, Allegheny Ordnance Plant, Cumberland MD
LC	Lake City Army Ammunition Plant, Independence MO *
LM	Lowell MA
M	Milwaukee Ordnance Plant, Milwaukee WI
RA	Remington Arms, Bridgeport CT **
REM-UMC	Remington-Union Metallic Cartridge, Bridgeport CT
SD	Sparklet Devices, Dover OH
SL	St. Louis Ordnance Plant, St. Louis MO
SMCO	Stant Manufacturing Co., Connersville IN
TW	Twin Cities Ordnance Plant, Minneapolis MN
U	Utah Ordnance Plant, Salt Lake City UT (late identifier)
UT	Utah Ordnance Plant, Salt Lake City UT (early identifier)
W	Winchester (during initial prototype case development)
WCC	Winchester (OLIN), E. Alton IL (modern identifier) *
WRA	Winchester Repeating Arms, New Haven CT

* In this caliber, the only plants remaining in production.

** This code is also used by Raufoss of Norway

Countries known to have manufactured this cartridge include: Argentina, Australia, Austria, Belgium, Brazil, Canada, mainland China, Dominican Republic, Egypt, Finland, France, Germany, Greece, India, Iran, Iraq, Israel, Italy, Japan, Korea, Mexico, Netherlands, New Zealand, Norway, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Syria, Turkey, UAE, UK, USA, and Yugoslavia.

Not to be forgotten, the .50 caliber machine gun itself has gone through many changes. Starting off as the M1921, there have been the M2, M3, M2HB, MG52, M85(6), and GAU-19 models. There have been aircraft versions, standard and heavy-barreled ground versions, air-cooled, water-cooled, and “quick-change” barreled versions, even a multi-barreled “gatling gun” variation. They have been mounted on aircraft, jets, helicopters, jeeps, trucks, “Hum-vees,” half-tracks, APC’s, tanks, “dune-buggies” (Fast Attack Vehicles), and ships.

The Future of the “Fifty Cal” :

