



# 9×19mm Parabellum

9×19mm Parabellum	
 <p>9×19mm Parabellum FMJ (<i>left</i>) and hollowpoint (<i>right</i>) rounds</p>	
<b>Type</b>	Handgun
<b>Place of origin</b>	 German Empire
Service history	
<b>Used by</b>	NATO and others
<b>Wars</b>	World War I–present
Production history	
<b>Designer</b>	Georg Luger
<b>Designed</b>	1901
<b>Produced</b>	1902–present
<b>Variants</b>	9 mm NATO 9×19mm Parabellum +P 9×19mm 7N21 +P+ 9×19mm 7N31 +P+
Specifications	
<b>Parent case</b>	7.65×21mm Parabellum
<b>Case type</b>	Rimless, tapered
<b>Bullet diameter</b>	9.01 mm (0.355 in)
<b>Neck diameter</b>	9.65 mm (0.380 in)
<b>Base diameter</b>	9.93 mm (0.391 in)
<b>Rim diameter</b>	9.96 mm (0.392 in)
<b>Rim thickness</b>	0.90 mm (0.035 in)
<b>Case length</b>	19.15 mm (0.754 in)
<b>Overall length</b>	29.69 mm (1.169 in)
<b>Case capacity</b>	0.862 cm <sup>3</sup> (13.30 gr H <sub>2</sub> O)
<b>Primer type</b>	Berdan or Boxer small pistol
<b>Maximum pressure</b>	235.00 MPa (34,084 psi)

Ballistic performance			
Bullet weight/type	Velocity	Energy	
7.45 g (115 gr) FMJ	390 m/s (1,300 ft/s)	570 J (420 ft·lbf)	
8.04 g (124 gr) FMJ	360 m/s (1,200 ft/s)	518 J (382 ft·lbf)	
7.50 g (116 gr) JHP	377 m/s (1,240 ft/s)	533 J (393 ft·lbf)	
7.45 g (115 gr) JHP +P	411 m/s (1,350 ft/s)	632 J (466 ft·lbf)	
7.45 g (115 gr) JHP +P+	435 m/s (1,430 ft/s)	704 J (519 ft·lbf)	
<i>Test barrel length: Tests 1,2&amp;3: 150mm(5.91in) / Tests 4&amp;5: 118mm(4.65in)</i> <i>Source(s): Sellier &amp; Bellot,<sup>[1]</sup> Vihtavuori Reloading Guide 2009,<sup>[2]</sup> Buffalo Bore,<sup>[3]</sup> C.I.P.,<sup>[4]</sup> Cor-Bon<sup>[4]</sup></i>			

The **9×19mm Parabellum** (abbreviated 9mm, 9mmP, 9×19mm or 9×19) cartridge was designed by Georg Luger and introduced in 1902 by the German weapons manufacturer Deutsche Waffen- und Munitionsfabriken (DWM) for their Luger semi-automatic pistol.<sup>[5]</sup> For this reason, it is designated as the **9mm Luger / 9mm Luger +P** by the SAAMI<sup>[6]</sup> and the **9 mm Luger** by the C.I.P. (differentiating it from the 9mm Makarov and 9mm Browning cartridges). Under STANAG 4090, it is a standard cartridge for NATO forces as well as many non-NATO countries.<sup>[7]</sup>

The name *Parabellum* is derived from the Latin: *Si vis pacem, para bellum* ("If you seek peace, prepare for war"), which was the motto of DWM.<sup>[8]</sup>

According to the 2006 edition of *Cartridges of the World*, the 9×19mm Parabellum is "the world's most popular and widely used military handgun cartridge."<sup>[9]</sup> In addition to being used by over 60% of police in the U.S., *Newsweek* credits 9×19 pistol sales with making semi-automatic pistols more popular than revolvers.<sup>[8]</sup> The popularity of this cartridge can be attributed to the widely held conviction that it is effective in police and self-defense use.<sup>[9]</sup> Its low cost and wide availability are self-sustaining contributors to the caliber's continuing popularity.

## Origins

Georg Luger developed the 9×19mm Parabellum cartridge from Luger's earlier 7.65×21mm Parabellum. In 1902, Luger presented the new round to the British Small Arms Committee as well as three prototype versions to the U.S. Army for testing at Springfield Arsenal in mid-1903. The German Navy adopted the cartridge in 1904 and in 1906 the German Army adopted it as well.<sup>[10]</sup>

The initial cartridge was created by removing the bottleneck of the 7.65 mm Luger cartridge, resulting in a tapered rimless cartridge. The ogive of the bullet was slightly redesigned in the 1910s in order to improve feeding.

To conserve lead during World War II in Germany, the lead core was replaced by an iron core encased with lead. This bullet, identified by a black bullet jacket, was designated as the 08 mE (*mit Eisenkern*—"with iron core"). By 1944, the black jacket of the 08 mE bullet was dropped and these bullets were produced with normal copper-colored jackets. Another wartime variation was designated the 08 sE bullet and identified by its dark gray jacket, and was created by compressing iron powder at high temperature into a solid material (*Sintereisen*—"sintered iron").<sup>[10]</sup>

## Popularity

After World War I, acceptance of this caliber increased. Nine-millimeter pistols and submachine guns were adopted by military and police users in a number of countries.<sup>[11]</sup> The 9×19mm Parabellum has become the most popular caliber for U.S. law enforcement agencies, primarily due to the availability of compact pistols with large magazine capacity that use this cartridge.<sup>[12]</sup>

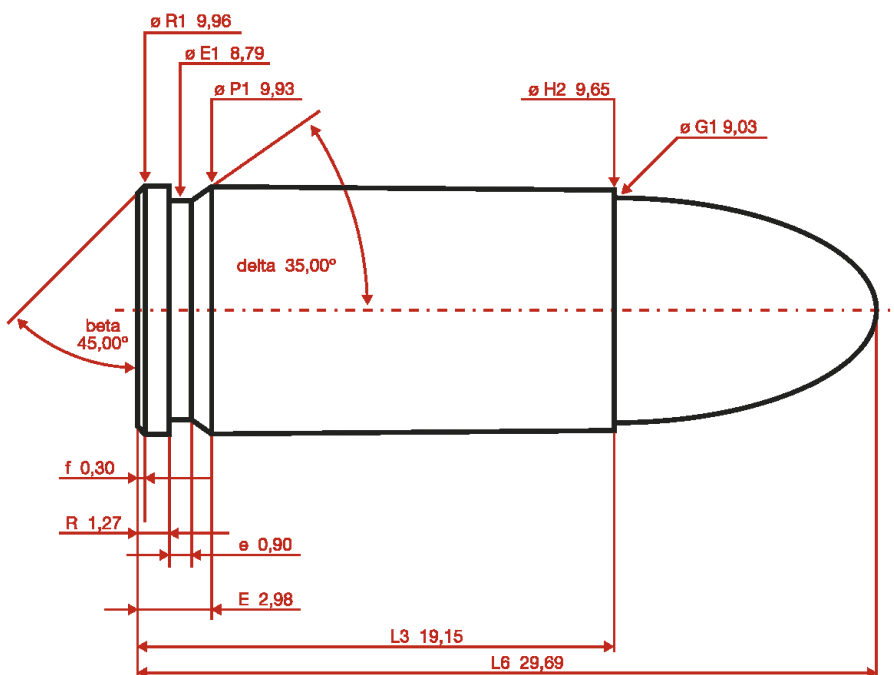
Worldwide, it is one of the more popular pistol cartridges where it is legal, (some countries ban civilian use of weapons that chamber current or former military cartridges) and cartridges in this caliber are generally available anywhere pistol ammunition is sold.

From the early 1980s to the mid-1990s, there was a sharp increase in the popularity of semiautomatic pistols which coincided with the adoption of the S&W Model 39 by the Illinois State Police in 1968, and the Beretta M9 (a military version of the Beretta Model 92) by the U.S. Army in 1985. Previously, most police departments issued .38 Special caliber revolvers with a six-shot capacity. The .38 Special was preferred to other weapons such as variants of the M1911 because it offered low recoil, was small and light enough to accommodate different shooters, and was relatively inexpensive.<sup>[1]</sup>

The 9mm is ballistically superior to the .38 Special revolver cartridge,<sup>[13]</sup> is shorter overall, and being an autoloader cartridge, it is stored in flat magazines, as opposed to cylindrical speedloaders. This, coupled with the advent of the so-called 'wonder nines' led to many US police departments exchanging their revolvers for some form of 9mm automatic handguns by the 1980s.<sup>[1]</sup>

## Cartridge dimensions

The 9×19mm Parabellum has 0.86 ml (13.3 grains H<sub>2</sub>O) cartridge case capacity.



**9×19mm Parabellum maximum C.I.P. cartridge dimensions.**<sup>[1]</sup> All sizes in millimeters (mm).

The cartridge headspaces on the mouth of the case.<sup>[14]</sup> The common rifling twist rate for this cartridge is 250 mm (1 in 9.84 in), 6 grooves, Ø lands = 8.82 mm, Ø grooves = 9.02 mm, land width = 2.49 mm and the primer type is small pistol.

According to the official C.I.P. (Commission Internationale Permanente Pour L'Epreuve Des Armes A Feu Portatives) guidelines the 9×19mm Parabellum case can handle up to 235 MPa (34,100 psi) piezo pressure. In C.I.P. regulated countries every pistol cartridge combo has to be proofed at 130% of this maximum C.I.P. pressure to certify for sale to consumers.

The SAAMI pressure limit for the 9×19mm Parabellum is set at 241.32 MPa (35,001 psi) piezo pressure.<sup>[15]</sup>

The SAAMI pressure limit for the 9×19 mm Parabellum +P is set at 265.45 MPa (38,500 psi) piezo pressure.

Empty case weighs approximately 4 g (0.14 oz).

## Performance

The round was originally designed to be lethal to 50 m but the bullet travels and is lethal at longer ranges.

The 9 mm cartridge combines a flat trajectory with moderate recoil. According to the 1986 book *Handloading*: "the modern science of wound ballistics has established beyond reasonable doubt that the 9mm cartridge is highly effective."<sup>[9]</sup>

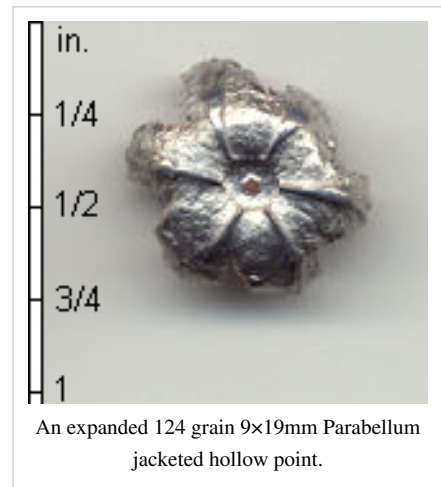
The energy delivered by most 9 mm loads allows for significant expansion and penetration with premium JHP bullets. Illinois State Police, Border Patrol, Federal Air Marshals and United States Secret Service favored and used 7.5 g (115 gr) +P+ 9 mm loads at 400 m/s (1,300 ft/s) for years with excellent results.<sup>[ ]</sup> Massad Ayoob has stated that the "Tried, Tested, and True" 7.5 g (115 gr) +P or +P+ is the best self-defense load in this caliber.<sup>[ ]</sup> Proponents of the hydrostatic shock theory contend that the energy of the 9mm cartridge is capable of imparting remote wounding effects known as hydrostatic shock, in human-sized living targets.<sup>[ ]</sup><sup>[16]</sup><sup>[17]</sup>

9×19mm Parabellum pistols with standard (not extended) double-stack magazines can hold up to 20 cartridges, such as the 9mm version of the SIG Sauer P226 Tactical Operations.

The table below shows common performance parameters for several 9×19mm loads. Bullet weights ranging from 115 to 147 gr (7.5 to 9.5 g) are common. Loads are available with energies from just over 400 J (300 ft-lb) to over 750 J (550 ft-lb), and penetration depths from 200 mm (8 in) to over 1.0 m (40 in) are available for various applications and risk assessments.



Three projectile types: unjacketed (lead), full metal jacket, and hollow point.



An expanded 124 grain 9×19mm Parabellum jacketed hollow point.

Manufacturer	Load	Mass	Velocity	Energy	Expansion <sup>[18]</sup>	Penetration <sup>[18]</sup>	PC <sup>[18]</sup>	TSC <sup>[18]</sup>
Cor-Bon	JHP	7.5 g (115 gr)	410 m/s (1,350 ft/s)	630 J (465 ft-lb)	14 mm (0.55 in)	360 mm (14.2 in)	56 mL (3.4 cu in)	631 mL (38.5 cu in)
ATOMIC Ammo	JHP+P	8.0 g (124 gr)	400 m/s (1,300 ft/s)	630 J (465 ft-lb)	15 mm (0.60 in)	330 mm (13 in)	0 mL (0 cu in)	0 mL (0 cu in) (est)
Speer	Gold Dot JHP	8.0 g (124 gr)	400 m/s (1,310 ft/s)	640 J (472 ft-lb)	18 mm (0.70 in)	337 mm (13.25 in)	84 mL (5.1 cu in)	616 mL (37.6 cu in) (est)
Federal	HydraShok JHP +P+	8.0 g (124 gr)	370 m/s (1,220 ft/s)	560 J (410 ft-lb)	17 mm (0.67 in)	340 mm (13.4 in)	77 mL (4.7 cu in)	734 mL (44.8 cu in)
Remington	Golden Saber JHP	9.5 g (147 gr)	300 m/s (990 ft/s)	430 J (320 ft-lb)	16 mm (0.62 in)	370 mm (14.5 in)	72 mL (4.4 cu in)	544 mL (33.2 cu in)
Winchester	Silvertip	7.5 g (115 gr)	373 m/s (1,225 ft/s)	519 J (383 ft-lb)	18 mm (0.72 in)	200 mm (8.0 in)	54 mL (3.3 cu in)	274 mL (16.7 cu in)
Winchester	WWB JHP	9.5 g (147 gr)	300 m/s (990 ft/s)	430 J (320 ft-lb)	15 mm (0.58 in)	400 mm (15.9 in)	69 mL (4.2 cu in)	321 mL (19.6 cu in)
Winchester	FMJ	7.5 g (115 gr)	352 m/s (1,155 ft/s)	462 J (341 ft-lb)	9.1 mm (0.36 in)	620 mm (24.5 in)	41 mL (2.5 cu in)	174 mL (10.6 cu in)

Key:

**Expansion:** expanded bullet diameter (ballistic gelatin).

**Penetration:** penetration depth (ballistic gelatin).

**PC:** permanent cavity volume (ballistic gelatin, FBI method).

**TSC:** temporary stretch cavity volume (ballistic gelatin).

## Improvements and variations

In addition to the traditional pressure values for this cartridge, there are two main variants that offer different pressure standards than the SAAMI or C.I.P requirements.

### 9×19mm +P variant



A 9mm Luger cartridge variant.

Attempts to improve ballistics of the cartridge came in the early 1990s with the widespread availability of high pressure loadings of the 9 mm cartridge. Such overpressure cartridges are labeled "+P" or in the case of very high pressure loadings "+P+".<sup>[19]</sup> Ballistic performance of these rounds was moderately improved over the standard loadings. In addition, improvements in jacketed hollow point bullet technology have produced bullet designs that are more likely to expand and less likely to fragment than earlier iterations, giving a 9 mm bullet better terminal effectiveness.<sup>[1]</sup>

## 9 mm NATO variant

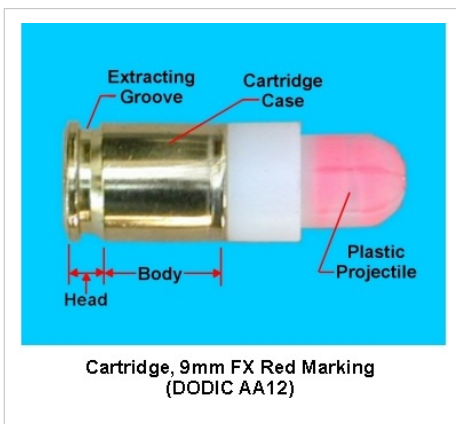
The 9 mm cartridge has been manufactured by, or for, more than 70 different countries and has become a standard pistol caliber for NATO and other military forces around the world. Its official nomenclature among NATO users is "9 mm NATO". The 9 mm NATO can be considered as an overpressure variant of the 9×19mm Parabellum that is defined by NATO standards.<sup>[20]</sup> The service pressure Pmax of the 9 mm NATO is rated at 252 MPa (36,500 psi) where C.I.P. rates the 9 mm Luger PTmax somewhat lower at 235 MPa (34,100 psi). The 315 MPa (45,700 psi) proofing test pressure used in the 9 mm NATO proof test however equals the proofing test pressure used in the 9 mm Luger C.I.P. proof test.

While the NATO standards do not specify the type of bullet to be used, Declaration III of the Hague Convention of 1899 prohibits the use of expanding ammunition in warfare by signatories, and therefore official 9 mm NATO ammunition is FMJ "ball" bullets. However, JAG attorneys for the U.S. military have issued opinions on the use of "open-tip" ammunition by snipers, stating that such ammunition is legal according to the laws of war including the Hague Convention ("open-tip" ammunition is still fully jacketed, and not *designed* to expand on impact).<sup>[21]</sup> Declaration III also does not apply in conflicts involving non-signatories to the Hague Convention, including paramilitary and other non-governmental fighting forces.<sup>[22]</sup>



Comparison of 7.62 mm NATO, 5.56 mm NATO and 9 mm NATO.

## 9 mm SESAMS



Cartridge, 9mm FX Red Marking (DODIC AA12)

The United States Military uses red and blue marking rounds in the 9mm caliber known as Special Effects Small Arms Marking Systems (SESAMS). Commonly used for training simulations, these rounds are comparable in function to the paintballs used in paintball markers, except they are fired with a powder charge, and can be shot in Beretta M9 service pistols with only a barrel modification (The Glock 19-series 9mm pistol, common among police departments, has a similar available modification). The 9mm SESAMS rounds are fired from specially modified pistols as well as M16 and M4 rifles, which are incapable of chambering standard live ammunition.



SESAMS weapons or components are normally painted blue or otherwise clearly marked, in order to denote their inert status and avoid a potentially catastrophic mixup with live-fire weapons.<sup>[23]</sup> This allows the armed forces to train with nearly identical equipment as used in real life situations.<sup>[24]</sup> The brand name for this ammunition, which is sold commercially and to law enforcement, is Simunition.

### Russian military overpressure variants

The Russian military has developed specialized 9×19mm cartridges that utilize relatively light bullets at high muzzle velocities for both pistols and submachine guns to defeat body armour.<sup>[25]</sup>

Besides enhanced penetration capabilities these overpressure variants offer a flatter trajectory and lessened recoil. The increase in service pressure causes a rise in bolt thrust, so the use of this overpressure ammunition induces more stress on critical weapon parts during firing. After initial research, conducted since the late 1980s under the codename "Grach", the Russian armed forces adopted two specialized 9×19mm variants.<sup>[1]</sup>



Box of "Cartridge, 9mm FX Blue Marking (DODIC AA21) with a modified Beretta M9 pistol

Chambering	7H21 (7N21)	7H31 (7N31) / PBP
Cartridge weight	9.5 g (147 gr)	8.1 g (125 gr)
Bullet weight	5.2 g (80.2 gr)	4.1 g (63.3 gr)
Muzzle velocity	460 m/s (1,509 ft/s)	600 m/s (1,969 ft/s)
Muzzle energy	561 J (414 ft-lbf)	756 J (558 ft-lbf)
Accuracy of fire at 25 m (27 yd) ( $R_{50}$ )	25 mm (1.0 in)	
Maximum pressure	280 MPa (41,000 psi)	

- $R_{50}$  at 25 m (27 yd) means the closest 50 percent of the shot group will all be within a circle of 25 mm (1.0 in) diameter at 25 m (27 yd).

The **7N21** (Cyrillic: 7H21) 9×19 mm overpressure variant features an armour piercing bullet and generates a peak pressure of 280 MPa (41,000 psi).<sup>[1]</sup> The 7N21 bullet features a hardened (sub-caliber) steel penetrator core, enclosed by a bimetal jacket. The space between the core and jacket is filled with polyethylene, and the tip of the penetrator is exposed at the front of the bullet, to achieve better penetration. The penetration range for body armor is specified at up to 40 m. The MP-443 Grach and GSh-18 pistols and PP-19-01, PP-90M1 and PP-2000 submachine guns were designed for usage with this overpressure cartridge. *Jane's Infantry Weapons* stated in 2003 that the 7N21 cartridge combines the 9×19mm Parabellum dimensions with a 9×21mm Gyurza bullet design and was developed specifically for the penetration of body armor and for the MP-443 Grach pistol, the latest Russian service pistol.<sup>[1]</sup>

The **7N31** (Cyrillic: 7H31) / **PBP** 9×19mm overpressure variant uses the same concept with a similar but lighter bullet that achieves higher muzzle velocity. The penetration of an 8 mm thick steel plate is specified at up to 10 m. The 7N31 cartridge was developed in the late 1990s for the GSh-18 pistol. The 7N31 was adopted for the PP-90M1 and PP-2000 submachine guns. Its maximum service pressure remains unclear.

## 9mm major

"9mm major" is a term common among handloaders in IPSC and USPSA competitions in the open division. It describes a 9×19mm loaded to reach or surpass the "major" power factor in those competitions, something that very few commercial self-defense loads do. Such loads are only rarely within the limits defined by SAAMI or CIP, exceeding even +P loads. Usually, they are relatively large charges of a relatively slow-burning powder combined with light bullets and a longer than standard OAL. Since they can be used with common 9×19 brass, they are considered a cheaper alternative to .38 Super. This ammunition puts a greater strain on the gun than normal ammunition.

## Other variants

VBR-B produces specialized bullets for this cartridge, a 2-part controlled fragmenting projectile and an armor-piercing bullet that features a brass sabot and a hardened steel penetrator. These are designed for increasing the content of the permanent wound cavity and double the chance to hit a vital organ.<sup>[26]</sup>

## Synonyms

- 9×19
- 9 mm
- 9 mm Luger
- 9 mm NATO
- 9×19mm
- 9×19mm NATO
- 9 mm Parabellum
- 9 mm Para

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## External links

- Article on 9×19mm Parabellum cartridge collecting including history with photos and descriptions of variations including headstamps (<http://cartridgecollectors.org/documents/Introduction-to-9mm-Luger-Cartridges.pdf>)
  - Ballistics By The Inch 9×19mm Parabellum Results. (<http://www.ballisticsbytheinch.com/9luger.html>)
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