= M249 light machine gun =

The M249 light machine gun (LMG) , formerly designated the M249 Squad Automatic Weapon (SAW) , and formally written as Light Machine Gun , 5 @.@ 56 mm , M249 , is the American adaptation of the Belgian FN Minimi , a light machine gun manufactured by the Belgian company FN Herstal (FN) . The M249 is manufactured in the United States by the local subsidiary FN Manufacturing LLC in South Carolina and is widely used in the U.S. Armed Forces . The weapon was introduced in 1984 after being judged the most effective of a number of candidate weapons to address the lack of automatic firepower in small units . The M249 provides infantry squads with the heavy volume of fire of a machine gun combined with accuracy and portability approaching that of a rifle .

The M249 is gas operated and air @-@ cooled . It has a quick @-@ change barrel , allowing the gunner to rapidly replace an overheated or jammed barrel . A folding bipod is attached near the front of the gun , though an M192 LGM tripod is available . It can be fed from both linked ammunition and STANAG magazines , like those used in the M16 and M4 . This allows the SAW gunner to use a rifleman 's magazines as an emergency source of ammunition in the event that he runs out of linked rounds .

M249s have seen action in every major conflict involving the United States since the U.S. invasion of Panama in 1989 . Soldiers are generally satisfied with the weapon 's performance , though there have been reports of clogging with dirt and sand . Due to the weight and age of the weapon , the United States Marine Corps is fielding the M27 Infantry Automatic Rifle with plans to partially replace the M249 in Marine Corps service .

The M249 is sometimes incorrectly referred to as a " Squad Assault Weapon " .

= = Development = =

In 1965 , the U.S. Army and U.S. Marine Corps ' primary machine guns were the M2 Browning and M60 . The M2 was a large @-@ caliber heavy machine gun , usually mounted on vehicles or in fixed emplacements . The M60 was a more mobile medium machine gun intended to be carried with the troops to provide heavy automatic fire . Both were very heavy weapons and usually required a crew of at least two to operate efficiently . The Browning automatic rifle , the army 's main individual machine gun since its introduction in World War I , was phased out in 1957 with the introduction of the M14 rifle , which had a fully automatic mode . " Designated riflemen " in every squad were ordered to use their weapons on the fully automatic setting , while other troops were required to use their rifle 's semi @-@ automatic mode on most occasions to increase accuracy and conserve ammunition . Because the M14 and M16 rifles had not been designed with sustained automatic fire in mind , they often overheated or jammed . The 20 @-@ round and 30 @-@ round magazines of these weapons limited their sustained automatic effectiveness when compared to belt @-@ fed weapons .

The Army decided that an individual machine gun , lighter than the M60 , but with more firepower than the M16 , would be advantageous ; troops would no longer have to rely on rifles for automatic fire . Through the 1960s , the introduction of a machine gun into the infantry squad was examined in various studies . While there was a brief flirtation with the concept of a flechette- or dart @-@ firing Universal Machine Gun during one study , most light machine gun experiments concentrated on the Stoner 63 light machine gun , a modular weapon that could be easily modified for different purposes . The Stoner 63 LMG saw combat for a brief period in Vietnam with the USMC , and later on a wider scale with the U.S. Navy SEALs .

In 1968 , the Army Small Arms Program developed plans for a new 5 @.@ 56 mm caliber LMG , though no funds were allocated (5 @.@ 56 mm ammunition was viewed as underpowered by many in the armed forces) . Studies of improved 5 @.@ 56 mm ammunition , with better performance characteristics , began . The earliest reference to studies of other caliber cartridges for the LMG did not appear until 1969 . In July 1970 , the U.S. Army finally approved development of an LMG , with no specified caliber . At this time , the nomenclature " Squad Automatic Weapon " (SAW) was

introduced . Actual design of alternative cartridges for the LMG did not begin until July 1971 . A month later , Frankford Arsenal decided on two cartridge designs for the new LMG : a 6 mm cartridge and a new 5 @.@ 56 mm cartridge with a much larger case . Neither design was finalized by March 1972 , when the Army published the specifications document for the planned SAW . The 6 mm cartridge design was eventually approved in May that year . Prior to July 1972 , SAW development contracts were awarded to Maremont , Philco Ford , and the Rodman Laboratory at Rock Island Arsenal . These companies produced designs with Army designations XM233 , XM234 and XM235 respectively ? X denoting " experimental " . Designs were required to have a weight of less than 9 @.@ 07 kg (20 lb) including 200 rounds of ammunition , and a range of at least 800 meters (2 @,@ 600 ft) .

When the time came for developmental and operational testing of the SAW candidates , three 5 @.@ 56 mm candidate weapons were included with the 6 mm candidates : the M16 HBAR , a heavy @-@ barrel variant of the M16 designed for prolonged firing ; the Fabrique Nationale de Herstal (FN) Minimi ; and the HK 23A1 . The initial round of tests ended in December 1974 . In February 1976 , the Minimi and Rodman XM235 SAW were selected for further development . At this time , opinions of the 6 mm cartridge were beginning to sour due to the logistical implications of providing yet another ammunition type to the infantry . In June , it was requested that the SAW specifications document be revised to emphasize standard 5 @.@ 56 mm ammunition . In October , the requested revisions were approved , and bids were solicited for the conversion of the Rodman XM235 to 5 @.@ 56 mm . Production of the converted XM235 was awarded to Ford Aerospace , and its designation was changed to XM248 . A new M16 HBAR variant , the XM106 , was developed in 1978 , and soon after , Heckler & Koch lobbied to include a 5 @.@ 56 mm conversion of its HK 21A1 (instead of the standard 7.62mm NATO ammunition it was built for) in future SAW testing . The latter model was designated the XM262 . At this time , the Minimi received the designation XM249 . Testing of the four candidates resumed in April 1979 .

In May 1980 , the FN XM249 was selected as the best choice for future development on the grounds of performance and cost , while the HK XM262 reportedly came a close second . In September , FN was awarded a " maturity phase " contract for further development of the XM249 , and testing of the new weapon began in June 1981 . The official adoption took place on February 1 , 1982 .

The new gun entered U.S. Army service as the M249 squad automatic weapon in 1984 , and was adopted by the U.S. Marine Corps a year later . The U.S. production model has a different butt from that of the regular Minimi . It is manufactured in the FN factory in Columbia , South Carolina .

Although found to be reliable and accurate , the M249 was considered to present unacceptable hazards in the form of an exposed hot barrel and sharp edges . There were complaints that the front sight required special adjustment tools . On August 23 , 1985 , then @-@ U.S. Under Secretary of the Army James R. Ambrose suspended M249 production pending the development of the product improvement program (PIP) intended to fix these problems . Congress deleted funds for the M249 from the Fiscal Year 1986 defense budget , then retroactively set aside the program 's prior year 's funds from the M249 program for other purposes , including retirement and pay raises . Over 1 @,@ 100 M249s already issued were to remain in use , but be retrofitted with the PIP kit when it became available . Over 7 @,@ 000 remaining M249s were to stay in storage at depots until corrective changes could be made . The PIP kit was eventually developed and implemented , and production of the M249 resumed . In 1994 the M249 squad automatic weapon was re @-@ designated the M249 light machine gun .

= = Design details = =

The M249 is a belt @-@ fed light machine gun . It fires the 5 @.@ 56 × 45mm NATO cartridge , usually a combination of one M856 tracer and four M855 ball cartridges fed from M27 linked belts . Belts are typically held in a hard plastic or soft canvas box attached to the underside of the weapon .

It fires from an open bolt and is gas operated . When the trigger is pulled , the bolt and bolt carrier

move forward under the power of the recoil spring . A cartridge is stripped from the belt , chambered , and discharged , sending a bullet down the bore . Expanding propellant gases are diverted through a hole in the barrel into a chamber . This pressure moves a piston providing the energy to extract and eject the spent casing as well as advance the belt and compress the recoil spring , thus preparing for subsequent shots . At 1 @,@ 041 mm (41 in) long and 7 @.@ 5 kg (17 lb) in weight (10 kg (22 lb) including a 200 @-@ round belt and plastic ammo box) , the M249 is a cumbersome weapon .

The barrel has a rifling twist rate of one turn in 180 mm (7 in) . Because firing heats up the bore , the air @-@ cooled barrel is equipped with a mechanism to remove and replace the barrel assembly with a spare . A folding bipod with adjustable legs is attached near the front of the weapon , though there are provisions for hard @-@ mounting to a M192 Lightweight Ground Mount tripod or vehicle mount . The M249 provides accuracy approaching that of a rifle , combined with the sustained volume of fire of a machine gun . Its original gas regulator offered two different gas port sizes , allowing cyclic rates of fire of 725 @-@ rounds per minute (r / min) or 1 @,@ 000 r / min . The latter setting was intended for adverse conditions , such as an excessively dirty firearm or cold weather . The two @-@ position gas regulator was discarded as part of a product improvement program . Sustained rate of fire , the rate of fire at which the gunner can fire continuously without overheating , is approximately 85 r / min .

= = Operational history = =

The M249 LMG entered service in 1984 as the M249 SAW . Initial reactions to the gun were mixed : it fulfilled the light machine gun role well when fired from the ground , but was not as effective when fired from the shoulder or hip . It was praised for its extreme durability and massive firepower , though a number of areas for improvement were highlighted : the blank firing attachment fitted poorly , the bipod was very weak and broke easily , the sling attachment was awkward , and there were many slots and gaps which accumulated dirt . Some claimed that the heavy @-@ barrelled version of the M16 rifle was a more effective light machine gun .

The M249 SAW was not used heavily before the 1991 Gulf War , though it has been used in every major U.S. conflict since . American personnel in Somalia in 1993 , Bosnia in 1994 , Kosovo in 1999 , Afghanistan in 2001 and Iraq since 2003 have been issued M249s . Surplus weapons were donated to Bolivia , Colombia and Tunisia .

Tactically , SAWs are either carried with a maneuvering unit and fired while handheld , or positioned to remain stationary and provide covering fire for other units . The usual load of ammunition carried for the weapon is 1 @,@ 000 @-@ rounds in five 200 @-@ round belts , although up to 500 extra rounds generally get loaded into 100 @-@ round soft pouches .

= = = Persian Gulf War = = =

A supply of 929 M249 SAWs was issued to personnel from the U.S. Army and USMC during the Persian Gulf War . Although exposure to combat was scarce , M249 gunners who were involved in fighting mainly used their weapons to provide cover fire for friendly maneuvering troops from fixed positions , rather than maneuvering with them . There were many complaints about the weapons clogging up with sand after prolonged use in the desert environment .

= = = Afghanistan = = =

The standard squad automatic weapon in Afghanistan is the M249 with PIP kit , which serves alongside its heavier counterpart , the M240 machine gun . Most M249s were given a collapsible buttstock immediately prior to the invasion to reduce its length and make the weapons more practical for parachuting and close @-@ quarters combat . Special Operations troops typically favor the shorter Para version of the weapon , which weighs much less .

A report entitled Lessons Learned in Afghanistan was released by Lieutenant Colonel Charlie Dean

and SFC Sam Newland of the U.S. Army Natick Soldier Center in 2002 . They found that 54 % of SAW gunners had problems maintaining their weapons , and 30 % reported that the gun rusted easily . Soldiers reported ammunition boxes rattling and falling off . 80 % percent of soldiers surveyed were pleased with the weapon 's accuracy and lethality , yet only 64 % claimed they were " confident in their weapon " . Weapons clogging up with sand in the desert seems to be the main complaint .

= = = Iraq War = = =

The PIP and Para versions of the M249 have been used in the Iraq war since the invasion . By 2004 , many M249s had been in service for almost 20 years and were becoming increasingly unreliable . Soldiers were requesting replacements and new features , and there are reports of soldiers holding their weapons together with duct tape . The lethality of the 5 @.@ 56 mm ammunition has been called into question by reports of enemy soldiers still firing after being hit multiple times . As in previous conflicts , the sandy environment causes the M249s and other weapons to clog up and jam if they are not cleaned very regularly .

Operation Iraqi Freedom PEO Soldier Lessons Learned , a report on the performance of weapons in the Iraq War , was published by Lieutenant Colonel Jim Smith of the U.S. Army on May 15 , 2003 . Smith spoke positively of the M249 , claiming that it " provided the requisite firepower at the squad level as intended " . He praised the SPW variant , noting that its " short barrel and forward pistol grip allowed for very effective use of the SAW in urban terrain " . At the National Defense Industrial Association in 2007 , LTC Al Kelly of the 1st Battalion , 17th Infantry gave a presentation describing the M249 as having " good range , excellent reliability " and an " excellent tracer " . He said that a cloth pouch was preferred over the plastic box for holding linked ammunition , and that " knock @-@ down power is poor but is compensated by rate of fire " .

In December 2006 , the Center for Naval Analyses released a report on U.S. small arms in combat . The CNA conducted surveys on 2 @,@ 608 troops returning from combat in Iraq and Afghanistan over the past 12 months . Only troops who fired their weapons at enemy targets were allowed to participate . 341 troops were armed with M249 SAWs , making up 13 percent of the survey . 71 percent of M249 users (242 troops) reported that they were satisfied with the weapon . 40 percent of users preferred feeding the SAW with the soft 100 @-@ round pouch , while 21 percent chose the soft and hard 200 @-@ round pouches each . 60 percent (205 troops) were satisfied with handling qualities , such as handguards , size , and weight - of those dissatisfied , just under half thought that it was too heavy . M249 users had the lowest levels of satisfaction with weapon maintainability at 70 percent (239 troops) , most due to the difficulty in removing and receiving small components and poor corrosion resistance . The SAW had the highest levels of stoppages at 30 percent (102 troops) , and 41 percent of those that experienced a stoppage said it had a large impact on their ability to clear the stoppage and re @-@ engage their target . 65 percent (222 troops) did not need their machine guns repaired while in theater . 65 percent (222 troops) were confident in the M249 's reliability , defined as level of soldier confidence their weapon will fire without malfunction , and 64 percent (218 troops) were confident in its durability , defined as level of soldier confidence their weapon will not break or need repair . Both factors were attributed to high levels of soldiers performing their own maintenance . 60 percent of M249 users offered recommendations for improvements . 17 percent of requests were for making the weapon lighter , and another 17 percent were for more durable belt links and drums , as well as other modifications , such as a collapsible stock .

= = Variants = =

M249 PIP

The product improvement program kit replaced the original steel tubular stock with a plastic stock based upon the shape of the heavier M240 machine gun . The change in stocks allowed for the addition of a hydraulic buffer system to reduce recoil . In addition , the dual gas port settings were

reduced to only one ; variants with the product improvement kit can no longer fire at a higher cyclic speed . A handguard was added above the barrel to prevent burns , and the formerly fixed barrel changing handle was swapped for a folding unit . Certain parts were beveled or chamfered to prevent cutting soldiers ' hands and arms . Other changes involved the bipod , pistol grip , flash suppressor , and sights . Over the years , additional modifications have been introduced as part of the Soldier Enhancement Program and Rapid Fielding Initiative . These include an improved bipod , 100 ? and 200 ? round fabric " soft pack " magazines (to replace the original plastic ammunition boxes) , and Picatinny rails for the feed tray cover and forearm so that optics and other accessories may be added .

M249 Paratrooper

The M249 Paratrooper , often called " Para " , is a compact version of the gun with a shorter barrel and sliding aluminum buttstock based on that of the Minimi Para , so @-@ called because of its intended use by airborne troops . It is much shorter and considerably lighter than the regular M249 at 893 mm (35 in) long and 7 @.@ 1 kg (16 lb) in weight . The Army 's Rapid Fielding Initiative is in the process of replacing the original collapsible buttstock with an adjustable model based loosely on the design of the M4 carbine buttstock .

M249 Special Purpose Weapon

This lightweight and shorter version of the M249 is designed to meet USSOCOM special operations forces requirements . The barrel changing handle , magazine insertion well , and vehicle mounting lug all have been removed to reduce weight . As a result , the SPW cannot be mounted in vehicles or use M16 magazines . Picatinny rails were added to the feed cover and forearm for the mounting of optics , lasers , vertical foregrips , and other M4 SOPMOD kit accessories . The SPW has a detachable bipod . The SPW 's lightweight barrel is longer than that of the Para model , giving it a total length of 908 mm (36 in) and a weight of 5 @.@ 7 kg (13 lb) .

Mk 46 Mod 0

This is a variant of the special purpose weapon adopted by USSOCOM . The program , which led to both the Mk 46 and Mk 48 , was headed by the US Naval Special Warfare Command (NAVSPECWAR) . Like the SPW , the barrel changing handle , magazine insertion well , and vehicle mounting lugs have been removed to save weight . However , the Mk 46 retains the standard M249 plastic buttstock instead of the collapsible buttstock used on the SPW . The Picatinny rail forearm differs slightly from the SPW . The Mk 46 has the option of using the lighter SPW barrel or a thicker , fluted barrel of the same length .

Mk 48

This is a 7 @.@ 62 × 51mm NATO version of the Mk 46 , used by USSOCOM , when a heavier cartridge is required . It is officially classified as an LWMG (Light Weight Machine Gun) and was developed as a replacement for the Mk 43 Mod 0 / 1 . The M60 based machine guns are a great deal more portable than the heavier M240 based designs used elsewhere in the US military in the infantry medium machine gun role . However , the M60 based designs have a long history of insufficient reliability . Trials conducted through the mid @-@ 1990s led the US Army to replace its M60 with the M240B GPMGs . The M240B , however , weighs in at ? 27 @.@ 5 lb and is about 49 " long with the standard barrel . NAVSPECWAR was reluctant to give up the increased portability of the M60 (? 22 @.@ 5 lb , 37 @.@ 7 " OAL with the shortest " Assault Barrel ") designs in spite of the M240 's increased reliability . A request was put in for a new machine gun in 2001 , and FN responded with a scaled @-@ up version of the M249 weighing in at ? 18 @.@ 5 lb with an OAL of ? 39 @.@ 5 " . The new design achieved much better reliability than the M60 @-@ based weapons while bettering its light weight and maintaining the same manual of arms as the already in @-@ use M249 . USSOCOM was slated to begin receiving deliveries of the new gun in August 2003 .

M249S

This is a semiautomatic version manufactured for the civilian sport shooting market . Derived from the fully automatic military firearm , this version shares most of the major components of the military models with the exception of the firing mechanism and the addition of welded internal components to prevent conversion to a fully automatic mode . Notably , this version retains the ability to be belt fed , an uncommon feature in civilian firearms .

= = Future = =

An extensive maintenance program intended to extend the service lives of M249s has been carried out to refurbish rifles , especially units that suffered from wear due to heavy use . In particular the warping of the receiver rails on the early @-@ models was a defect that occurred in heavily used first @-@ generation M249s . This defect however has been completely eliminated on later models and is no longer present on the current @-@ issue M249 , which has reinforced rails and full @-@ length welding rather than spot welding .

The U.S. Marine Corps tested the M27 Infantry Automatic Rifle , a lighter , magazine @-@ fed rifle to supplement and partially replace the M249 . With plans to buy up to 4 @,@ 100 IARs to complement and partially replace its 10 @,@ 000 M249s (of which 8 @,@ 000 will remain in service) held at platoon level , it has acquired 450 of the Heckler & Koch HK416 ? based weapons for testing . The U.S. Army does not plan to introduce the IAR . Colonel Robert Radcliffe of the U.S. Army Infantry Research and Development Center stated that an automatic rifle with a magazine would lower the effectiveness and firepower of a squad . While the Marine Corps has 13 @-@ man squads , the Army organizes its soldiers into squads of nine and needs considerably more firepower from the squad machine gunners to make up the difference . The U.S. Army does , however , want to replace aging M249s with newer weapons . They are currently working on replacing the M249 's buttstock with a redesigned adjustable stock .