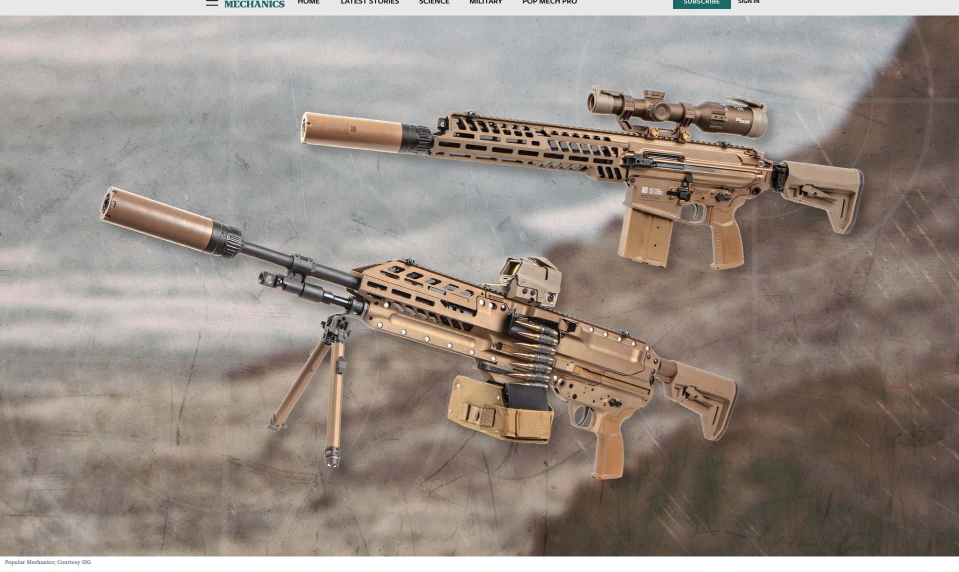


Popular Mechanics; Courtesy SIG

We Fired the Army's New Rifle and Machine Gun. It Was a Heavy-Metal Experience

The new M7 rifle and M250 machine gun are designed to give U.S. soldiers the upper hand in the global shooting match.

BY ERIC TEGLER · PUBLISHED: AUG 17, 2023

SAVE ARTICLE

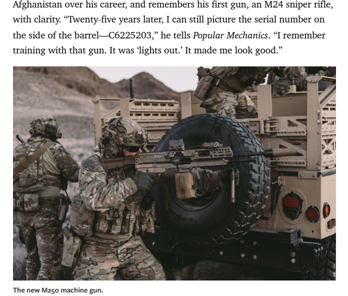
Ron Cohen recalls lugging an M240 machine gun around while he served as a young infantryman with the Israel Defense Forces. At 5'9" and about 150 pounds, carrying the 26-pound weapon was a strain. But he remembers something else more vividly.

"The scariest thing that can happen to you as a soldier is when you're shooting at an [enemy] and you've shot him and he ain't dead," he tells *Popular Mechanics*.

That single, frightening thought sums up why the U.S. Army is making the biggest change in soldier equipment since the Vietnam War. The service is introducing a new individual rifle, a new machine gun, and a new caliber for both weapons at the same time; the rifle will be called the M7, and the machine gun, the M250. New Hampshire-based SIG Sauer designed the guns, which are currently in production, and Cohen is the company's CEO.

In a world of advanced fighters like the F-35, new mega-aircraft carriers like the *USS Ford*, unmanned AI-controlled drones, and forthcoming robotic tanks, infantry firearms are almost always an afterthought. But there is no more personal weapons system than the gun an Army soldier carries. Put yourself in his or her shoes and imagine maintaining it, carrying it, sleeping with it, and fighting with it.

Former Army Ranger, Jason St. John, can do that. Today, he's SIG Sauer's director of strategic products. He served as a sniper and parachuted into Afghanistan on October 18, 2001 in the first airborne assault targeting al-Qaeda after the September 11 attacks. He made six deployments to Afghanistan over his career, and remembers his first gun, an M24 sniper rifle, with clarity. "Twenty-five years later, I can still picture the serial number on the side of the barrel—C6225203," he tells *Popular Mechanics*. "I remember training with that gun. It was 'lights out.' It made me look good."



The new M250 machine gun.

Sig Sauer

At least two generations of soldiers have similar feelings about the M4 and M249, the rifle and machine gun that the M7 and M250 will replace. Starting in 2024, the latter will be gradually introduced into the Army's Close Combat forces—the 120,000 soldiers who actually close in on and fight with the enemy, as opposed to the broader force of about 465,000. The new guns will feature upgraded optical and thermal sights, but most meaningfully, they'll fire punchier, longer-ranged 6.8-millimeter ammunition compared to the 5.56-millimeter ammo fired by the M4/M249.

The Army determined the heavier rounds are needed in a 2017 study, which found that new body armor Russia and China widely made and sold is effective in stopping 5.56-millimeter rounds at medium to long ranges (300–500 yards). The same year, General Mark Milley, then Army chief of staff, told Congress that body armor as cheap as $250 could stop the 5.56-millimeter rounds fired by the M4 and M249. Such body armor has since spread around the world, recently in use in places like Ukraine.

The prospect of hitting an enemy with 5.56-millimeter rounds from an M4 or M249 and not stopping him led the Army to launch its Next Generation Squad Weapon (NGSW) program in 2018. Last April, the Army selected SIG Sauer to provide the new M7 Squad Weapon and M250 Squad Automatic Weapon (SAW), as well as innovative new shell cases for the 6.8-millimeter ammunition they will fire.

The Feel of Heavier Metal

To gain an impression of what the new M7 and M250 will feel like in the hands of Close Combat soldiers, I traveled to the SIG Sauer Academy in Epping, New Hampshire, as a guest of the company. The Academy complex sits on 140 acres and includes indoor and outdoor gun ranges, plus tactical training areas simulating urban and other environments.

Laid out on two tables were the heaviest firearms I'd ever been in contact with. (I'm a relative gun novice with limited experience using the handguns, rifles, and shotguns many Americans are familiar with.) SIG engineers had set up a selection for comparison, including the M4 and M249, the M7 and M250, as well as the classic M240 7.62-millimeter machine gun and SIG Sauer's MHS military pistol.

We started by picking up each weapon to assess its heft, feel, and features. The difference in weight between the M4 and M7 is immediately evident. The former weighs about 6.4 pounds empty; according to the Army, the M7 tips the scales at 10.07 pounds with its suppressor (which suppresses noise) in place. There's less of a weight difference without the suppressor, but the M7 will generally be used with it to aid verbal communication between squad members in a fight.

The author fires the M7 rifle at Sig Sauer's heavy weapons range at the SIG Sauer Academy in Epping, New Hampshire. Its feel is noticeably heavier and more serious than its M4 predecessor.

Eric Tegler

As I held each carbine, manipulated it, and shifted my weight, I was reminded of the fact that soldiers *carry* their guns—they shoot them only a tiny fraction of their careers. An oft-repeated mantra in the U.S. military is that "ounces equal pounds, and pounds equal pain." The roughly three-pound difference between the two weapons will be apparent on long days and marches over long distances.

I shot the M4 first, both in semi- and full-automatic modes. It feels solid, but still light and easy to wield. There is pronounced recoil, but I admit I was so pumped up by firing it that I barely noticed. Holding the trigger down on a full automatic for the first time and letting 5.56-millimeter rounds fly is adrenaline-inducing, try as I might to hide it. But the M4 never really felt threatening. I felt I could run and shoot with it, or flop down on my stomach and quickly aim.

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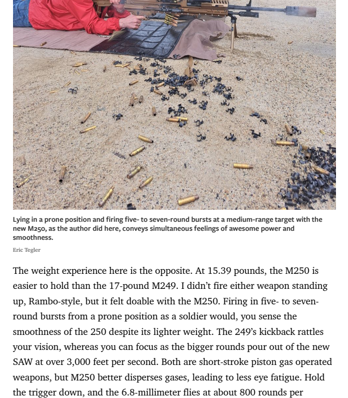
The M7, meanwhile, *does* feel like a threat. Bringing it to a firing position, you notice the additional weight, particularly the nose weight with the suppressor at the end of the barrel. It's more work to cycle the gun through a field of movement. The trigger feels smoother, more substantial. I'm immediately aware that heavier rounds are issuing from the barrel at higher velocity, yet the recoil and kickback are less than with the M4. I wasn't really aiming for a tight pattern of bullets on target, but the M7 suggested I could place my fire well at significant distances with practice.

The feeling of power is evident in your chest and visible as you lean more forward in your firing stance. Hours later, I realized that I hadn't noticed the weight when firing and I imagine soldiers won't either when in a firefight. Then, it was time to fire the machine guns.



Lying in a prone position and firing five- to seven-round bursts at a medium-range target with the new M250, as the author did here, conveys simultaneous feelings of awesome power and smoothness.

Eric Tegler

The weight experience here is the opposite. At 15.39 pounds, the M250 is easier to hold than the 17-pound M249. I didn't fire either weapon standing up, Rambo-style, but it felt doable with the M250. Firing in five- to seven-round bursts from a prone position as a soldier would, you sense the smoothness of the 250 despite its lighter weight. The 249's kickback rattles your vision, whereas you can focus as the bigger rounds pour out of the new SAW at over 3,000 feet per second. Both are short-stroke piston gas operated weapons, but M250 better disperses gases, leading to less eye fatigue. Hold the trigger down, and the 6.8-millimeter flies at about 800 rounds per minute.

SIG also gave me the chance to shoot the M240 machine gun. It's a real "Shock and Awe" experience—a heavy Cadillac of a machine gun with so much punch you feel you could take anyone on. But I can truly sense that the M250 can shoot further with more power and without the M240's energy-sapping weight.

The new carbine and SAW have undeniable power and refinement, but their weight is a concern. I'm 5'10" and about 160 pounds, and I notice it. Female soldiers will take more notice. The few videos online of females shooting the M7 or the MCX-Spear from which it derives show far-forward firing stances that look awkward. The Army and SIG Sauer say male and female soldiers successfully operated and manipulated the carbines during evaluations, but my impression is that women will find it challenging.

But the Army has other challenges in mind.

The Global Shooting Match

The Army's desire to field new, more powerful firearms is not just a function of its desire to overcome the better personal protection equipment that U.S. adversaries now have. It's also a reaction to the new guns those adversaries are fielding.

China has begun issuing its own new rifles and machine guns. In 2021, it publicly debuted its new QBZ-191, a Western-style assault rifle similar in profile to America's AR-15/M16 platform. With a reported maximum effective range of about 300 yards, the QBZ-191 can't match the M4's 550-yard range, but it fires a slightly heavier 5.8-millimeter round, which presumably packs more personal armor-piercing punch than the M4's 5.56-millimeter ammo. China's new QJS-161 machine gun also fires 5.8-millimeter rounds, though its range is likely less than the reported 765-yard range of the M249.

China's QBZ-191 automatic rifle at the 2021 Zhuhai Airshow.

Dun3031949/Wikimedia Commons

Range and energy have become important metrics for global armies as they seek to protect their own soldiers at longer distances and to overcome newer body armor. This latest emphasis reflects a nine-decade evolution of America's own infantry weapons, which have alternately prioritized firepower or lighter weight and larger magazines. The relatively heavy (nine-plus pound) 7.62-millimeter M1 Garand and M14 rifles carried by soldiers in WWII and into Vietnam gave way to the lighter (6.3-pound) post-Vietnam 5.56-millimeter M16 and today's M4. The new M7/M250 platforms shift the focus back to ballistic punch at the cost of higher weight.

But the shift is needed, the Army says. Jason St. John agrees. "We've always looked at the 5.56-millimeter ammunition as not being a super-effective combat round, at least in my military career … it's not lethal enough, it doesn't have enough energy at certain ranges."

The M4 and M249 fit with Army doctrine during much of the Global War on Terror, when engaging irregular enemies at close ranges was the rule. In such situations, the volume of fire delivered by lighter-caliber weapons mattered more than their firepower. But an Army report on U.S. troops' performance in ground combat in the latter period of the Afghanistan conflict found that the average gunfight was well beyond 332 yards. St. John contends that in a new era of peer adversaries with long-range gun sights, new infantry tactics and technology, volume is no longer king.

"You don't need as many shots to be lethal with something that's more powerful," he observes. "You see the necessity for U.S. soldiers to be in an advantageous [standoff] position and I think the 6.8-millimeter round and guns provide it."

The Guns Or The Ammo?

Technically, the M4 and the new M7 are carbines, shorter-barreled than traditional full rifles. Shorter rifle barrels generally equate to less range, but the M7 bucks that generalization. It apparently does so by such a margin that its range and striking power are classified. Media reports have put the new carbine's effective range at anywhere from 1,000–1,200 yards. There is little public information on the M250's range, but it is believed to be as good or better than the 1,860-yard range of SIG Sauer's heavier MG 338 machine gun.

How do the new guns practically double the range and power of their predecessors? The answer lies in a combination of the high pressures which their ammunition can create and which their firearms can tolerate.

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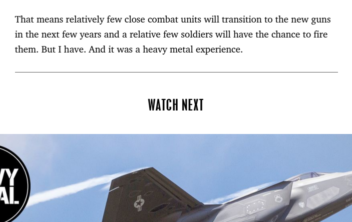
Higher firing-chamber pressures typically allow rounds to leave rifle or machine-gun barrels at higher velocities, resulting in greater accuracy. While the M4 has an average firing-chamber pressure of about 52,000 psi, the M7 fires its larger rounds with approximately 80,000 psi. Making a gun that can produce higher chamber pressures isn't simple, but it has been done through redesign and new materials. The M7, for example, is based on a scaled-up version of SIG's commercially available MCX platform, which was released in 2015. The MCX's firing-chamber pressure is similar to the M4.

What's harder is making ammo that can withstand higher pressures. Historically, gun manufacturers have increased ammunition cartridge size to accommodate increased pressure, making their rifle barrels longer and their weapons bigger and heavier in the process. But SIG Sauer developed a thinner, lighter hybrid brass/alloy cartridge to pair with 6.8-millimeter projectiles, reducing overall weight by 30 percent. It can withstand higher chamber pressures without having to grow in size, thus allowing guns to remain smaller while boosting their performance.



Sig Sauer

SIG Sauer is manufacturing the first batch of ammunition to go with the M7/M250, while the Army builds a new facility to produce it at the Lake City Army Ammunition Plant in Independence, Missouri. With the new factory not set to open until 2026, M7s and M250s won't be produced at a high rate until full ammo production gets rolling. The Army is currently in the process of production qualification testing the weapons at Aberdeen Proving Ground in Maryland, verifying that they "operate reliably in all combat conditions and environments."

That means relatively few close combat units will transition to the new guns in the next few years and a relative few soldiers will have the chance to fire them. But I have. And it was a heavy metal experience.

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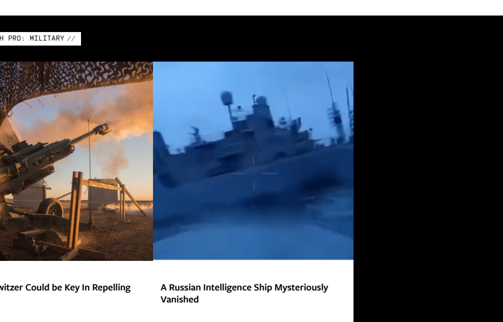

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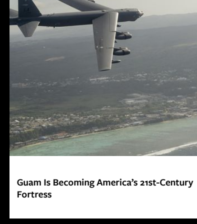

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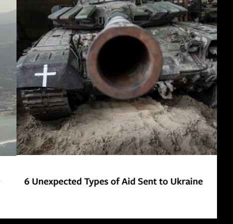

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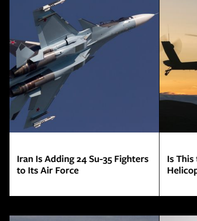

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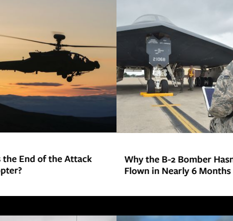

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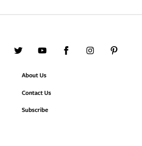

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