

# BAE Systems develops improved small-calibre ammunition for UK military

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The UK armed forces have begun the process of acquiring new types of 5.56 mm and 7.62 mm calibre ammunition to improve the effectiveness of their rifles and machine guns, after decades of employing NATO standard rounds with only minor modifications.

The development of the ammunition is being led by BAE Systems Munitions, whose Radway Green site has the last surviving British mass-production small-arms ammunition plant. The factory was refurbished a few years ago after the government signed a 15-year Munitions Acquisition Supply Solution (MASS) contract guaranteeing a minimum level of orders to make the investment worthwhile.

The first small arms to benefit are those in 7.62 mm calibre, principally the L7A2 general purpose machine gun (GPMG) and the L129A1 sharpshooter rifle. The standard L44A1 ball round and the more precisely-made L42A1 sniper ammunition have become the primary types of ammunition used in these weapons and typically comprise a full metal jacket (FMJ) with a lead core.

BAE Systems Munitions has developed a new round designated L59A1, also referred to as High Performance (HP), in which the front half of the core is replaced by hardened steel. It is similar in design to the bullet used in the NATO 5.56 mm standard ball round, known internationally as the SS109. The L59A1 bullet is slightly heavier - 10 g compared with 9.33 g for the L44A1 - and longer, so there is less room for propellant. As a result a more powerful propellant is required to match the ballistics of the L44A1. This increases cost and is therefore currently only being used "in more specialist areas".

A variation of the L59A1 design known as the IB (Improved Ball), which has a shorter and lighter bullet so that the standard propellant can be used, is currently being assessed by the Ministry of Defence (MoD) for its suitability for general use. Ultimately, it is planned to introduce an even more effective bullet with a solid hardened steel core: the Enhanced Performance (EP) round, similar to the EP being evaluated in 5.56 mm calibre. The 7.62 mm version is at an early development stage and is not expected to become qualified for service for several years.

The principal British infantry weapons using 5.56 mm ammunition are the members of the SA80 family, most significantly the L85A2 rifle. Less used are the L86A2 light support weapon and the short-barrelled L22A2 carbine. The L110A1 belt-fed light machine gun (LMG) from FN of Belgium, which is popularly known as the Minimi, has also fallen out of favour since a recent re-evaluation of the infantry's needs.

The current 5.56 mm NATO ball round is designated L15A2 and L17A2, both being equivalent to the NATO SS109. The difference between the L15 and L17 is in the propellant used - the L15 uses ball propellant which works best in the AR-15 family (including the US M16 and M4 plus the L119, the Canadian C8 carbine used by British special forces), while the L17 has been optimised for reliable functioning in the SA80 family. The bullet is the same in both, featuring a two-part core with steel in the nose and lead behind.

Both of these rounds are expected to be replaced by the L31A1, which is currently undergoing full qualification testing. This is expected to be completed by the end of 2016. The L31, also known as the Enhanced Performance (EP) round, differs in its bullet structure from the L15/L17, as the core consists of a one-piece hardened steel element. Penetration is therefore superior, although the ballistics and trajectory are designed to match the older rounds. It also uses a new ball powder which has the same effectiveness in AR-15 and SA80 families.

These new developments represent a gradual move away from the use of lead in bullets which has come under increasing criticism for environmental reasons, especially on practice ranges which experience a high concentration of fire. In contrast with the US, which has also developed lead-free bullets with improved penetration, the UK is maintaining an FMJ design for all of its military bullets, in compliance with the MoD's Law of Armed Conflict.

If these rounds succeeded in replacing the standard NATO designs they are likely to remain in service until the current suite of weapons is replaced, a process which is currently scheduled to begin in the mid-2020s. The calibre(s) of ammunition which will be chosen for the next generation of weapons is yet to be determined.



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The 5.56 mm L31A1 EP round. (Anthony G Williams)



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The 7.62 mm L59A1 HP is aimed at replacing the L44A1 and L42A1 rounds. (Anthony G Williams)