B61 nuclear bomb

B61 training munition

The B61 nuclear bomb is the primary thermonuclear weapon in the U.S. Enduring Stockpile following the end of the Cold War. It is an intermediate yield strategic and tactical nuclear weapon featuring a two-stage radiation implosion design.

The B61 is a variable yield bomb (0.3 to 340 kiloton yield in various mods and settings) designed for carriage by high-speed aircraft. It has a streamlined casing capable of withstanding supersonic flight speeds. The weapon is 11 ft 8 in (3.58 m) long, with a diameter of about 13 in (33 cm). Basic weight is about 700 lb (320 kg), although the weights of individual weapons may vary depending on version and fuse/retardation configuration.

A B61 bomb undergoing disassembly.

The B61, known before 1968 as the TX-61, was designed in 1963. It was designed and built by the Los Alamos National Laboratory in New Mexico. It began from a program for a lightweight, streamlined weapon launched in 1961. Production engineering began in 1965, with full production beginning in 1968 following a series of development problems.

Total production of all versions was approximately 3,155, of which approximately 1,925 remain in service as of 2002, and some 1,265 are considered to be operational. The warhead has changed little over the years, although early versions have been upgraded to improve the safety features.

Nine versions (or 'Mods') of the B61 have been produced. Each shares the same 'physics package,' with different yield options.
The newest variant is the B61 Mod 11, deployed in 1997, which is a ground-penetrating bunker buster.

The B61 unguided bomb should not be confused with the MGM-1 Matador cruise missile, which originally was developed under the bomber designation B-61.

When the B61 was still classified, aircrew were not allowed to use the term "B61". Instead, it was referred to as a "shape", "silver bullet", or even "external delivery".

B61 bomb in various stages of assembly. The nuclear component is contained in the small, silver cylinder near the upper middle.

The B61 has been deployed by a very wide variety of U.S. military aircraft. Aircraft cleared for its use have included the B-58 Hustler, B-1, B-2, B-52, and FB-111 strategic bomber aircraft; the F-100 Super Sabre, F-104 Starfighter, F-105 Thunderchief, F-111 and F-4 Phantom II fighter bombers; the A-4 Skyhawk, A-6 Intruder, and A-7 Corsair II attack aircraft; the F-15 Eagle and F-15E Strike Eagle; British, German and Italian Panavia Tornado IDS aircraft. USAF, Belgian, Turkish Air Force and Dutch F-16 Fighting Falcon can also carry the B61.
Since the F-22 Raptor will not be used for the nuclear mission the B61 will instead be carried by the Lockheed Martin F-35 Lightning II.

Though exact numbers are hard to establish, research done by the Natural Resources Defense Council suggests approximately 480 are deployed with United States Air Force units in various European countries.

As of 2005, 180 tactical B61 nuclear bombs are deployed in Europe under the NATO nuclear sharing arrangement.

Inert training version of a B61 in an underground Weapons Storage and Security System (WS3) vault at Volkel Air Base, Holland. An access panel on the warhead is open, showing the interface for actions such as PAL (safety/arming) and variable yield setting.

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The newest variant is the B61 Mod 11, a hardened penetration bomb with a reinforced casing (according to some sources, containing depleted uranium) and a delayed-action fuse, allowing it to penetrate several meters into the ground before detonating, damaging fortified structures further underground. The Mod 11 weighs about 1,200 lb (540 kg). Developed from 1994, the Mod 11 went into service in 1997 replacing the older megaton-yield B53 bomb, a limited number of which had been retained for anti-fortification use. About 50 Mod 11 bombs have been produced, their warheads converted from Mod 7 bombs. At present, the primary carrier for the B61 Mod 11 is the B-2 Spirit.

Most versions of the B61 are equipped with a parachute retarder (currently a 24-ft (7.3 m) diameter nylon/Kevlar chute) to slow the weapon in its descent. This offers the aircraft a chance to escape the

blast, or allows the weapon to survive impact with the ground in lay down mode. The B61 can be set for airburst, ground burst, or lay down detonation, and can be released at speeds up to Mach 2 and altitudes as low as 50 feet (15 m).

The B61 is a variable yield, kiloton-range weapon called "Full Fusing Option"(FUFO) or "Dial-a-yield" by many service personnel. Tactical versions (Mods 3, 4, and 10) can be set to 0.3, 1.5, 5, 10, 60, 80, or 170 kiloton explosive yield (depending on version). The strategic version (B61 Mod 7) has four yield options, with a maximum of 340 kilotons. Sources conflict on the yield of the earth-penetrating Mod 11; the physics package or bomb core components of the Mod 11 are apparently unchanged from the earlier strategic Mod 7; however, the declassified 2001 Nuclear Posture Review states that the B-61-11 has only a single yield; some sources indicate 10 kt, others suggest the 340 kiloton maximum yield as the Mod-7.

The early Mods 0, 1, 2, and 5 have been retired (Mods 6, 8, and 9 were cancelled before production), and the Mod 10 has been moved to the inactive stockpile, leaving the Mods 3, 4, 7, and 11 as the only variants in active service.

The U.S. intended to refurbish the B61 bombs under its Life Extension Program with the intention that the weapons should remain operational until at least 2025.

However, the United States Congress ordered that this work be stopped pending reports from the National Academy of Sciences and JASON defense advisory panel.

In May 2010 the National Nuclear Security Administration asked Congress for $40 million to redesign the bomb to enable the Lockheed Martin F-35 Lightning II to carry the weapon internally by 2017. This version is designated Mod.12. The four hundred B61-12 bombs will be used by both tactical aircraft (such as the F-35) and strategic aircraft (such as the B-2) and the Tail Subassembly (TSA) will give them Joint Direct Attack Munitions levels of accuracy, allowing the fifty kiloton warhead to have strategic effects from all carrying aircraft.

B61s on a bomb rack.