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# RO Defence 120mm tank gun ammunition

**Armament**
120 mm L11 tank gun; 120 mm L30A1 (CHARM) tank gun.

**Development**
British 120 mm tank guns are rifled as opposed to the smoothbores of the Rheinmetall DeTec and similar 120 mm tank guns. The first service version of the current 120 mm guns was the L11. The L11 was fitted to the Chieftain series and Challenger 1 MBTs (the earlier Conqueror used an entirely different gun and ammunition family) and was developed to the L11A5 stage. Development work was also carried out on a series of next-generation `Modern Technology' tank guns, which resulted in the 120 mm L30A1 (CHARM - CHallenger ARMament) gun fitted to the Challenger 2 MBT and, at one time, destined to be retrofitted to the Challenger 1.

The L30A1 gun can continue to fire the existing range of Royal Ordnance (now BAE Systems, RO Defence) 120 mm ammunition (apart from the APDS L15) and new high-performance APFSDS projectiles. However, the L30 gun uses a new propellant charge system, the L14, to fire APFSDS. The L14 propellant system, which is based on rigid Combustible Case Charges (CCC), was modified to allow it to be used operationally with L11 guns during Operation Granby/Desert Storm. The code word for this project was Jericho.

**Description**
All RO Defence 120 mm tank gun ammunition is manually separate loaded, although the bundled stick propellant charges may be loaded in either calico bags or as rigid thin-walled CCC; at one time bagged charges were used for all types of projectile. All charges are ignited electrically via vent tubes fed from a vent tube loader. The vent tubes may be the L3 for the L11 gun or L4 for the L30 gun.

The main types of projectile involved are as follows:

APFSDS L23 This is the main projectile used for the attack of armour and involves a monobloc tungsten nickel copper long rod penetrator carried in a light alloy sabot. The penetrator rod uses six aluminium fins. The projectile assembly is fired using an L8 CCC containing 6.65 kg of AX/S64-20 triple-base propellant in stick form. It can also be fired using a modified L14 CCC. Muzzle velocity is 1,534 m/s and the maximum effective range is given as 3,500 m.

APFSDS L26 Originally the XL26E1, this projectile is intended for use in the 55 calibre L30 gun currently used on the Challenger 2 MBT and, at one time, intended to be retrofitted to the Challenger 1. The original CHARM 1 system version of this projectile used a Depleted Uranium (DU) penetrator rod. For the L30 gun the L26 is fired using the L14A1 or L14A2 CCC which contains RDX-based propellant in stick form. This projectile can also be fired from L11 guns using the L8 or L12 charges. The total weight of this projectile is 8.5 kg and it is 525 mm long overall.

APFSDS L27 This is known as the CHARM 3 APFSDS, with a greater Depleted Uranium (DU) penetrator length-to-diameter ratio than earlier models and is thus

`significantly more effective'. Integration development of the CHARM 3 round began during the early 1990s but was delayed from 1997 onwards by a lack of ranges suitable for firing trials within the UK. Even so the APFSDS L27A1 became available for service with British Army Challenger 2 MBT regiments during 1999, ahead of the planned schedule. The L27A1 is fired using the L16A1 CCC.

A competition to provide a CHARM 3 Training Round (C3TR) for the L27 was won by RO Defence at the end of 1999. The 120 mm C3TR consists of a charge and a saboted projectile assembly and, following development, will be manufactured at Birtley and Glascoed.

APDS L15 The APDS round was the original anti-armour element of the 120 mm L11 series tank gun ammunition family. While it has been largely replaced as the primary anti-armour round by APFSDS rounds the APDS L15 remains a potent armour-piercing munition with a high hit probability at combat ranges; it has been estimated that the APDS L15 can penetrate 355 mm of armour at 1,000 m. The subprojectile is stated to be capable of penetrating the armour of most current MBTs at battle ranges. The APDS L15 uses a dense tungsten alloy penetrator subprojectile carried in a light alloy sabot. The projectile assembly is fired using the L4 CCC which contains 8.4 kg of NQ/S53-12 propellant. Muzzle velocity is 1,370 m/s.

120 mm APDS L15 is not fired from the L30 gun.

DS/T Prac L20A1 This is a relatively low-cost training projectile with the subprojectile penetrator made from steel with a light alloy nose. The DS/T Prac L20A1 subprojectile matches the trajectory of the APDS L15 out to 1,100 m, after which it requires a much smaller safety trace than the operational L15 subprojectile (the L20A1 also extends barrel life). The L20A1 can also be used as a training equivalent to the APFSDS L23 out to a range of 2,000 m. The DS/T Prac L20A1 is fired using the L5 CCC which contains 5.16 kg of NQ/S27-09 propellant. Muzzle velocity is 1,451 m/s.

British Army consumption of the DS/T L20A1 was forecast to run at about 60,000 units per year until 1998.

HESH L31 The HESH L31 is employed as a general purpose round with a good anti-armour performance as it is capable of defeating a NATO heavy single target at all ranges up to a maximum of 8,500 m; it can also be used in the indirect fire role. The projectile consists of a thin-walled projectile with a rounded ogive filled with 4.2 kg of RDX/Wax explosive detonated by a base percussion fuze. As with other projectiles of its nature, when the HESH L31 projectile strikes a target the thin walls collapse to allow the explosive to be spread over the surface of the target before the base fuze functions. The resultant detonation creates shock waves which force off a large high-velocity scab of material from the inner surface of the target armour. The latter capability makes the HESH L31 projectile effective against fortifications and structures as well as armoured targets. The HESH L31 is fired using the L3 bag charge containing 3.04 kg of NQ/S27-09 triple-base propellant. Muzzle velocity is 670 m/s.

SH/Prac L32A6 This training projectile is used to simulate the operational HESH L31 which it matches ballistically. The SH/Prac L32A6 is available in a completely inert form, filled with an inert HE substitute (a composition of calcium sulphate and castor oil), or an inert HE substitute plus a live fuze and a flash pellet for spotting purposes. Four small tracers are housed in the projectile base. As with the HESH L31, the SH/Prac L32A6 is fired using the L3 bag charge containing 3.04 kg of NQ/S27-09 propellant. Muzzle velocity is 670 m/s.

British Army consumption of the SH/Prac L32A6 was forecast to run at about 20,000 units per year until 1998.

WP Smoke L34 In visual appearance and ballistic performance, the WP Smoke L34 matches the HESH L31. It is a bursting type of smoke projectile with which an internal burster charge is used to break open the projectile's steel walls to release the White Phosphorus (WP) contents weighing 4.2 kg. The WP then rapidly creates a visually opaque smoke screen which lasts for at least 30 seconds, depending on the ambient weather conditions. The WP Smoke L34 is fired using

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the L3 bag charge containing 3.04 kg of NQ/S27-09 propellant. Muzzle velocity is 670 m/s. If required, the SH/Prac L32 can be used as a training projectile for the WP Smoke L34.

A Canister projectile was developed for use with the L11 gun but it was not placed in production. It was fired using the L3 bag charge and discharged pellets lethal against unprotected personnel up to a range of 200 m from the gun muzzle.

Drill ammunition, consisting of inert projectiles and charges, is available.

**Specifications**

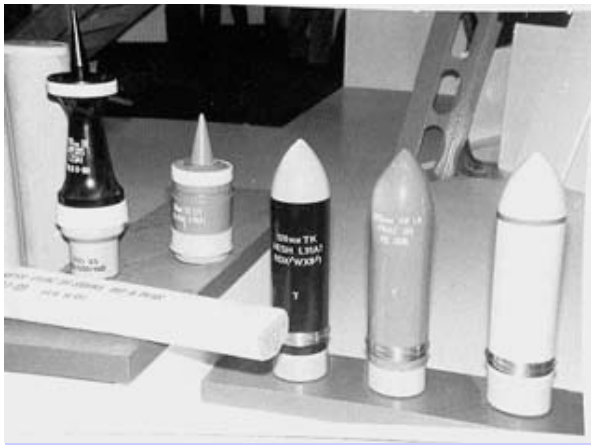
| **Type** | **APFSDS** | **APDS** | **HESH** |
|---|---|---|---|
| **Designation** | L23 | L15 | L31 |
| **Weights:** | | | |
| ***Projectile*** | 8 kg | 10.36 kg | 17.1 kg |
| ***Propellant*** | 6.65 kg | 8.4 kg | 3.04 kg |
| **Projectile length** | 512 mm | | 511 mm |
| **Type of propellant** | AX/S64-20 | NQ/S53-12 | NQ/S27-09 |
| **Muzzle velocity** | 1,534 m/s | 1,370 m/s | 670 m/s |

| **Type** | **WP Smoke** | **DS/T Prac** | **SH/Prac** |
|---|---|---|---|
| **Designation** | L34 | L20 | L32 |
| **Weights:** | | | |
| ***Projectile*** | 17.3 kg | 5.8 kg | 17.1 kg |
| ***Propellant*** | 3.04 kg | 5.16 kg | 3.04 kg |
| **Projectile length** | 511 mm | 300 mm | 508 mm |
| **Type of propellant** | NQ/S27-09 | NQ/S27-09 | NQ/S27-09 |
| **Muzzle velocity** | 670 m/s | 1,451 m/s | 670 m/s |

**Authorised fuzes**
APFSDS and APDS - none involved
HESH and WP Smoke - BD, type not specified

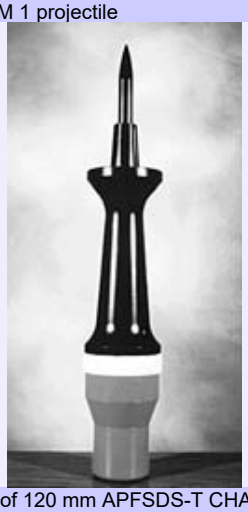
**Equivalent rounds**
IRAN

**Manufacturer**
Defence Industries Organisation, Ammunition Division
Type: 120 mm HESH
Description: Understood to be based on HESH L31 but projectile weight given as 16.65 kg containing 3.55 kg of an unspecified explosive. Propellant weight is 2.73 kg and muzzle velocity 670 m/s. Maximum range is 2,530 m. Base fuze given as BZ 120



RO Defence 120 mm tank gun projectiles, from left: APFSDS-T L23A1; DS/T Prac L20A1; HESH L31A7; SH/Prac L32 and WP Smoke L32 (T J Gander)

RO Defence 120 mm APFSDS-T L26 CHARM 1 projectile



Model of 120 mm APFSDS-T CHARM 3 projectile

Cross-section drawing of projectile assembly for 120 mm APFSDS-T L23 produced by RO Defence (2000)

Cross-section drawing of Smoke WP L23 projectile produced by RO Defence (2000)

## More information on this product

See our products section for more information and pricing on Ammunition Handbook.