6.5x25 CBJ

Personal Defense Weapons

CBJ Tech

www.cbjtech.com

What is a PDW?

Personal defense weapons (PDWs) are a class of compact, magazine-fed automatic firearms that are typically submachine guns designed to fire rifle-like cartridges. Most PDWs fire a small-caliber (generally less than 8 mm or 0.31 in in bullet diameter), high-velocity centerfire bottleneck cartridge resembling a scaled-down intermediate cartridge, essentially making them an "in-between" hybrid between a submachine gun and a conventional carbine.

The use of these rifle-like cartridges gives the PDWs much better ballistic performance (effective range, external ballistics and armor-penetrating capability) than conventional pistols or submachine guns, which fire larger-caliber handgun cartridges with slower and less aerodynamic projectiles. The low recoil of these "sub-intermediate" cartridges also makes muzzle jumps on PDWs (which typically have short barrels) much easier to handle than short-barreled rifles, especially when shooting in automatic fire or burst fire.

The name describes the weapon's original conceptual role: as a compact but powerful small arm that can be conveniently carried for personal defense, usually by support personnel behind the front line such as officers, military engineers, logistic drivers, medical specialists, artillery crews etc. These "second line" personnel are not strictly combat troops expected to directly engage the enemy but may still be at risk of encountering decently equipped (and often well-armored) hostile skirmishers and infiltrators, therefore having to defend themselves in close quarters. Such encounters will warrant an effective weapon that is easy to use while having sufficient firepower to suppress enemy charges and hold them beyond a safe perimeter to prevent the defenders from being overrun, but the risk of hostility is rare enough that a standard service rifle would be an unnecessary burden during their normal duties.

Because of their light weight, controllability, ease of operation and close-range effectiveness, with the ability to penetrate a NATO CRISAT vest or an NIJ IIIA soft Kevlar armor at up to 200 m, PDWs have also been used by special forces, paramilitaries, heavily armed tactical police, and bodyguards.

The 6.5x25 CBJ cartridge

6.5x25 CBJ APDS *6.5x25 CBJ HET* *6.5x25 CBJ Subsonic AP* *6.5x25 CBJ Frangible* *6.5x25 CBJ HP* *6.5x25 CBJ Blank* *6.5x25 CBJ Drill*

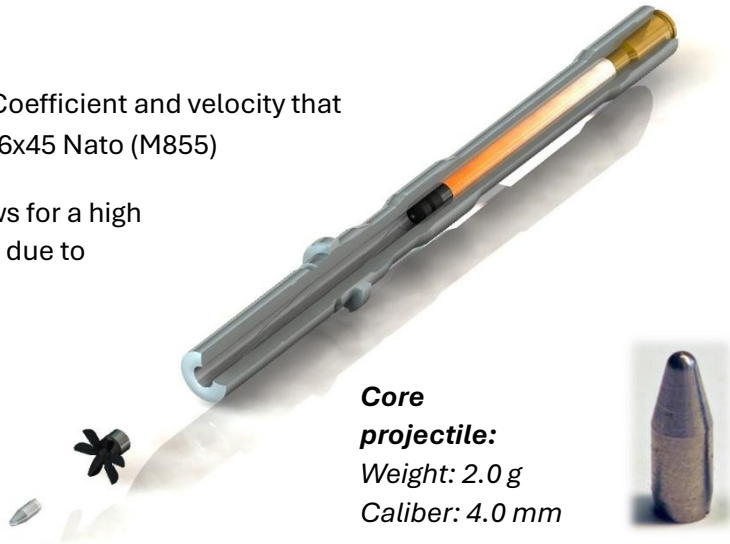
The 6.5x25 CBJ is a new cartridge system developed by CBJ Tech AB of Sweden. It can be used in most weapons chambered for the 9x19 Parabellum cartridge where only the barrel is replaced.

The different variants of the system cover any application and offers high, and in many aspects extreme, performance in pistols, Personal Defense Weapons, Submachine Guns and short assault rifles. All variants, except Blank, can be used in the same weapon without any alterations.

Key characteristics:

- High velocity; V_0 of 730-900m/s depending on barrel length
- Optional penetration, from minimal to extreme, depending on cartridge variant
- High hit probability due to low recoil and good ballistic performance
- High wounding effect
- High system flexibility
- The sub caliber variant – APDS – has a Ballistic Coefficient and velocity that gives it a very similar trajectory to that of the 5.56x45 Nato (M855)

The subcaliber technology with a discarding sabot allows for a high muzzle velocity an high maintained velocity down range due to the separation from the sabot after the muzzle.



Core projectile:
Weight: 2.0 g
Caliber: 4.0 mm

6.5x25 CBJ APDS
The 6.5x25 CBJ APDS (Armor Piercing Discarding Sabot) is the highest performing cartridge variant, with a tungsten projectile enclosed in a discarding plastic sabot.
It offers high penetration and wounding capability, even at long range, and is effective against all targets normally engaged with small arms fire.
It will penetrate the NATO CRISAT target and 35cm+ of ballistic gelatin at a range of 300m, and it will penetrate Russian MT-LB APC armor up to 50m.

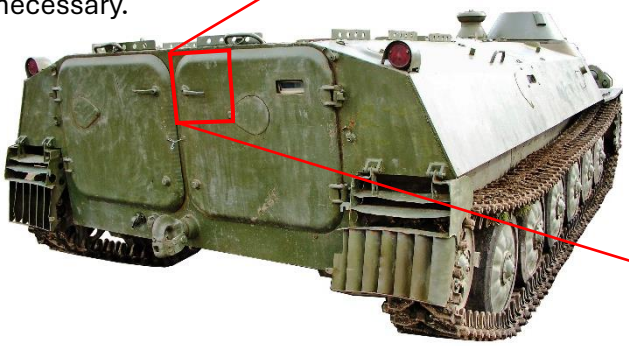
CBJ Tech

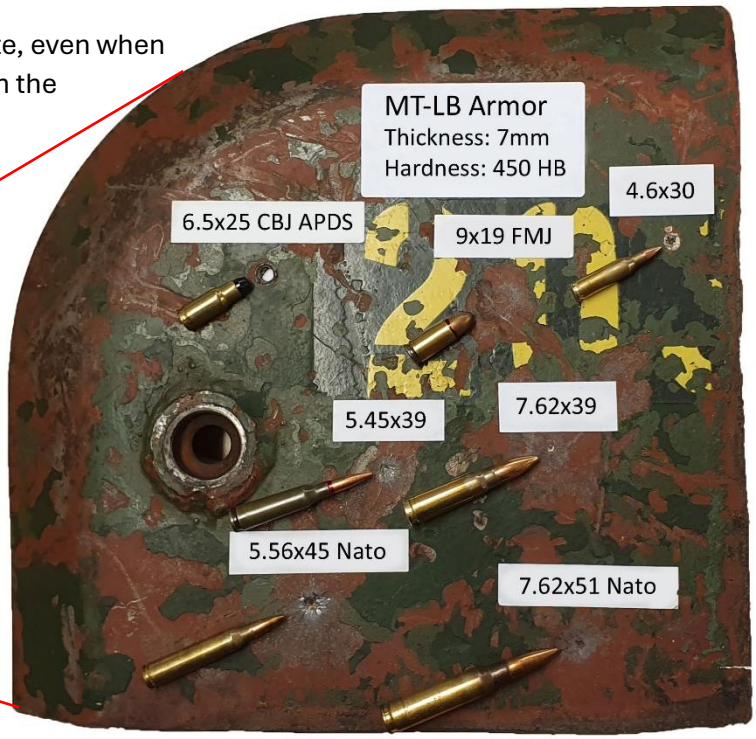
www.cbjtech.com

The high retained velocity allows for a high target hitting velocity. This combined with the high density and strength of the tungsten core projectile compared to conventional FMJ projectiles, gives the 6.5x25 CBJ APDS excellent armor piercing capability.

The armor plate on the right is a piece of a rear door, taken from a Russian MT-LB armored personnel carrier. It was designed to withstand hits from small arms fire, which it normally does, even up to .50 Browning FMJ.

However, the 6.5x25 CBJ APDS does penetrate the plate, even when fired from a pistol, like the Glock 17, or in this case with the HK MP5. This is a good example of the excellent armor piercing capability of the 6.5x25 CBJ APDS compared to other cartridges that are more powerful and requires larger and heavier weapons. However, it is not advisable to use pistols as primary anti-armor weapons against APC´s, unless it is absolutely necessary.



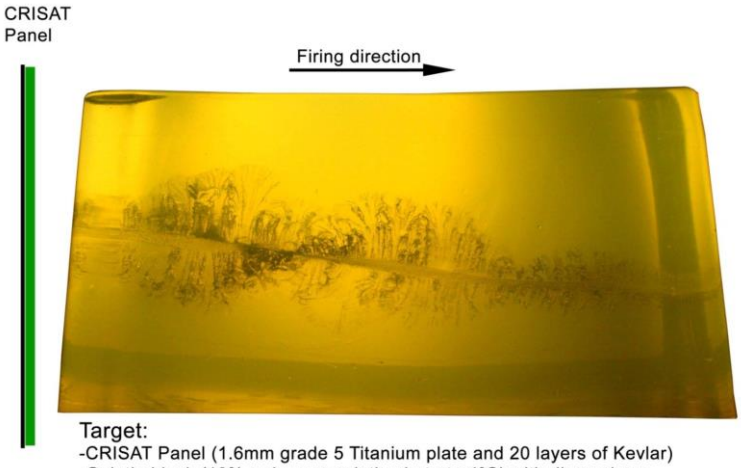


Shown to the right is the effect in soft tissue simulant, ballistic gelatin, of the 6.5x25 CBJ APDS fired from an HK MP5.

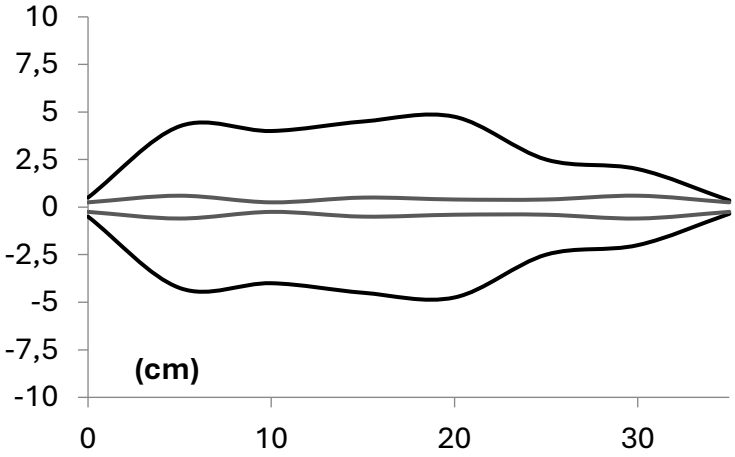
In front of the block of ballistic gelatin, a NATO CRISAT panel is placed. The CRISAT panel is a standardized body armor panel consisting of a 1.6mm grade 5 titanium plate in front of 20 layers of Kevlar.

This panel is known for stopping most types of 9x19mm ammunition but will not stop faster projectiles from assault rifles or modern PDWs.

Illustrated to the right is the Wound Profile of the test, which visualizes the permanent and temporary cavities. The permanent cavity is outlined in the center, and it shows the remaining hole from the projectile. The outer cavity is the temporary tissue stretch from when the projectile passes the tissue simulant, and the plot is based on measurements taken of the radial cracks in the gelatin according to the generally acknowledged Wound Profile Method by Fackler and Malinowski.



Target:
-CRISAT Panel (1.6mm grade 5 Titanium plate and 20 layers of Kevlar)
-Gelatin block (10% ordnance gelatin shot at +4°C) with dimensions:
Length (Firing direction): 340mm, Height: 200mm, Width: 250mm
Vt (Impact velocity): 847m/s



CBJ Tech

www.cbjtech.com

6.5x25 CBJ HET
The 6.5x25 CBJ High Energy Transfer has a full caliber solid brass projectile.
It is highly effective against targets protected up to NIJ level II within a range of about 50m with pistol and 100m with SMG/PDW, after which lethality is rapidly reduced, making it suitable for use in sensitive environments, like typical use in Law Enforcement.

6.5x25 CBJ Subsonic AP
The 6.5x25 CBJ Subsonic Armor Piercing fires a heavy, full caliber copper jacketed tungsten projectile at subsonic speed.
It can be effectively used with sound suppressors and offers relatively good penetration, low velocity drop down range and a substantial wounding effect.

6.5x25 CBJ Frangible
This cartridge has a projectile made of sintered metal powder.
Penetration capacity of hard objects is minimal, though it will not fragment when penetrating soft tissue.
As a low cost training/competition round for target shooting, it is effective out to 150m.
As a combat cartridge for use in very sensitive environments, it is effective within 50m with pistol and 100m with SMG/PDW, after which lethality is rapidly reduced.

6.5x25 CBJ HP
This 6.5x25 CBJ Hollow Point has a full caliber solid copper projectile with a hollow point tip.
It is excellent for Law Enforcement use, as well as self-defense.
The combat range is 50m with pistol and 100m with SMG/PDW, after which lethality is rapidly reduced.
It can also be used for competition shooting with a range up to 150m, or for hunting up to 100m.

6.5x25 CBJ Blank
This is a conventional blank cartridge developed for training purposes, such as double-sided exercises etc. A blank firing device needs to be attached in order to have a fully functioning cycling.

6.5x25 CBJ Drill
This cartridge is an inert dummy cartridge intended for training purposes such as loading and unloading drills, actions during stoppage etc.

6.5x25 CBJ Ballistic Data

Cartridge variant	APDS		HET		Subsonic AP		Frangible		HP	
Barrel length, mm	114	300	114	300	114	300	114	300	114	300
V_0, m/s	730	900	730	900	300	325	730	900	730	900
E_0, J	533	810	666	1013	360	423	666	1013	666	1013
V_{50}, m/s	678	841	491	621	289	311	491	621	491	621
E_{50}, J	460	707	302	482	334	387	302	482	302	482
V_{300}, m/s	457	578	177	192	244	259	177	192	177	192
E_{300}, J	209	334	39	46	239	268	39	46	39	46

CBJ Tech

www.cbjtech.com

PDW classes

A true PDW is not a shortened assault rifle in caliber 5.56x45 Nato or .300 Blackout, because although these types of weapons are smaller than their full-length variants, they are still quite large due to the size of the receiver, which is determined by the cartridge length.

With a modern cartridge like the 6.5x25 CBJ, Personal Defense Weapons can be divided into different classes, depending on what type of weapon platform is used:

1. Pistol

A modern service pistol, typically with a striker fire mechanism and a plastic frame, like the Glock 17, chambered in 6.5x25 CBJ

Glock 17:
Cartridge: 6.5x25 CBJ

Advantages:
- Very compact and lightweight
- Easy to carry in a holster, even concealed if necessary
- The 6.5x25 CBJ cartridge gives the pistol the ability to penetrate body armor up to NIJ level 3a, and have a significantly improved wounding effect, compared to 9x19mm.

Disadvantages:
- Compared to shoulder fired weapons it is much harder to hit targets with a pistol. It requires significantly more training to maintain skills to hit targets fast and with accuracy, compared to other weapons.
- The ammunition capacity can sometimes be limited by magazines with smaller capacity.

2. Enhanced Pistol

There are several products on the market that enhances the ability to hit with a pistol. One is the Recovery stock fitted to the pistol (shown in the pictures here). This is compact and lightweight enough to be constantly fitted to the pistol, while still being able to carry the pistol in a holster. The pistol can be fired both with the stock extended and folded.

Glock 17:
Fitted with red dot sight and Recovery stock
Cartridge: 6.5x25 CBJ

Advantages:

- Significantly increased hit probability when fired from the shoulder with the stock extended.
- A Red dot sight fitted to the slide of the pistol makes aiming simpler and faster, and combined with the stock, the risk of losing the red dot in the sight due to the pistol being misaligned is reduced.
- The shooter can fire more rapidly at longer ranges and still hit the target. The need for training is reduced compared to shooting a pistol without an attached stock.
- The pistol can still be carried in a holster.
- The Enhanced Pistol can still be fired with the stock folded with one or two hands, like a normal pistol.

Holster

Glock 17:
Fitted with red dot sight and Recovery stock (folded)
Cartridge: 6.5x25 CBJ

Disadvantages:

- The Enhanced Pistol is a little bit more bulky than the standard pistol. It can be holstered but it is less convenient to carry, especially if concealed.
- The felt recoil when shooting is a little bit sharp and less comfortable than shooting with a submachine gun.

Glock 17:
Fitted with red dot sight, Recovery stock (folded) and a holster (left and right side).
Cartridge: 6.5x25 CBJ

CBJ Tech

www.cbjtech.com

3. Pistol + Carbine conversion kit

There are several products on the market called pistol carbine conversion kits. The KPOS Scout is one of them, and it allows for a pistol to be fitted inside an aluminum and plastic chassis, that transforms the pistol into a small two handed weapon with shooting characteristics more similar to a submachine gun than a pistol

KPOS Scout
Glock 17

Glock 17:
Cartridge: 6.5x25 CBJ

Advantages:

- Significantly increased hit probability when fired from the shoulder with the stock extended.
- A full length Picatinny rail allows for a Red dot sight to be fitted to the chassis makes aiming simpler and faster.
- The shooter can fire more rapidly at longer ranges and still hit the target. The need for training is reduced compared to shooting a pistol without an attached chassis.
- Other attachments like lights or laser sights can be mounted on the Picatinny rails on the sides.
- The pistol can still be used normally without the chassis and carried in a holster.
- This system gives the user 2 weapons in 1. Attaching or removing the pistol from the chassis takes about 10 seconds and requires no tools.

KPOS Scout with Glock 17 mounted
Stock folded

Disadvantages:

- The pistol cannot be equipped with a red dot sight directly on the slide, so conventional sights must be used with the pistol outside the chassis.
- The practical accuracy with the pistol mounted in the chassis is better than with the pistol alone, but it is still not quite as good as a submachine gun.
- The recoil is softer with the chassis than with a Recovery stock attached to the pistol, but still not as soft as a submachine gun.

KPOS Scout with Glock 17 mounted
Stock extended

HK MP5:
Cartridge: 6.5x25 CBJ

4. Submachine Gun / Pistol Caliber Carbine

The submachine gun or the pistol caliber carbine with a receiver and frame purpose built for a short cartridge like the 6.5x25 CBJ is small and compact compared to an assault rifle. The 6.5x25 CBJ cartridge has a uniquely high performance from short barrels, and it gives assault rifle like performance from medium length barrels between 8” and 10” (200 – 250 mm).

HK MP5:
Cartridge: 6.5x25 CBJ

HK MP5:
Cartridge: 6.5x25 CBJ

One weapon system that has been successfully converted from 9x19mm to the 6.5x25 CBJ is the HK MP5. It is a well-proven design, known for its reliability, soft recoil and very good accuracy. Chambered in 6.5x25 CBJ it is still soft shooting, but it has a significantly improved performance. The 9" (225mm) barrel gives a muzzle velocity of 870m/s and the 6.5x25 CBJ APDS has a trajectory that matches 5.56x45 Nato M/855 fired from an M4 assault rifle.

Also Pistol Caliber Carbines of AR 15 type is a very good match with the 6.5x25 CBJ cartridge. The variants designed with a delayed blowback are most optimized for conversion to 6.5x25 CBJ. One example is the Maxim Defense MD:9 SBR with a Roller Delayed Buffer System.

Maxim Defense MD:9 SBR:
Cartridge: 6.5x25 CBJ

Maxim Defense Roller Delayed Buffer System:
Only for 9x19 / 6.5x25 CBJ Weapons

CBJ Tech

www.cbjtech.com

Advantages:
- Very low recoil and soft to shoot with the 6.5x25 CBJ in these types of weapons.
- Very good accuracy. Tests have shown that the HK MP5 in 6.5x25 CBJ fulfills the NATO requirements for accuracy for 5.56x45 Nato assault rifles.
- Increased ballistic performance; flatter trajectory, better penetration capacity and better wounding effect with increased muzzle velocity from the longer barrels of the submachine guns and Pistol Caliber Carbines.
- Larger capacity magazines.
- Ability to shoot fully automatic with full control of the weapon, which increases hit probability and wounding effect.

Disadvantages:
- Not as small and compact as a pistol

Cartridge weight

All the variants of the 6.5x25 CBJ cartridge (Except for the Subsonic AP and Blank) weigh 8g. This gives a significant reduction in carried weight compared to traditional 9x19mm or 5.56x45 Nato cartridges, that both weigh 12g each. With 2/3 of the weight for every cartridge, the carried weight for the user can be reduced, or instead the amount of carried ammunition can be increased by 50% while still maintaining the same overall weight for the weapon and ammunition. A reduced weight for the ammunition carried could increase the flexibility to carry other types of equipment without increasing the overall load for the user.

Summary

The 6.5x25 CBJ cartridge combined with multiple types of weapon systems gives full flexibility to find a Personal Defense Weapon system that is ideal for the user. From extremely compact in the form of a modern pistol, to the submachine gun, the user can optimize the balance between size, weight, firepower and range, without sacrificing either of these factors fully. The high muzzle velocity from the short pistol barrel maintains most of the performance, and the larger submachine gun is still smaller and more compact than a short assault rifle.

The armor piercing capability of the 6.5x25 CBJ APDS completely changes the way these weapon systems can be used. Targets that earlier required larger and heavier weapons can now be defeated with a pistol. This will forever change the doctrine on the battlefield.

CBJ Tech

www.cbjtech.com

Technical specifications and numerical data are given as an indication only and are of no contractual nature.