

## Armament details

The primary armament of the XG-48E3 *Comanche* Battle-cruiser-class heavy tracked truck is a 5-inch diameter bore, 24-inch long case cannon in the 8.2 million foot pound class, the XG-47E5-2. Unlike cannons used in the Lone Free State so far, it possesses no rifling, relying instead on drag stabilization via fins located at the rear of the projectiles to stabilize them. The gun itself weighs 4,892 lbs, complete with recoil system, thermal systems, and other ancillary systems.

At the muzzle, a 140-port pepperpot muzzle brake cut directly into the gun's barrel provides a large degree of backforce to reduce the recoil, but the special design of the brake prevents it from interfering with the separation of the sabot projectiles, and has no negative effect on accuracy thereby.

A muzzle reference system is affixed to the gun, allowing the gunsight to "see" where the barrel of the gun is pointing, and thereby allow automatic adjustment of the optics, and on/off pushbutton slaving of gunsights with the gun.

Every Lone Star State sniper knows the effect that changes in barrel temperature have on the impact of his bullets. The XG-47E5-2 is protected from thermal changes by a foam-filled shroud which reduces 95% of the heat transmission and eliminates variations due to differential heating in sun and shade.

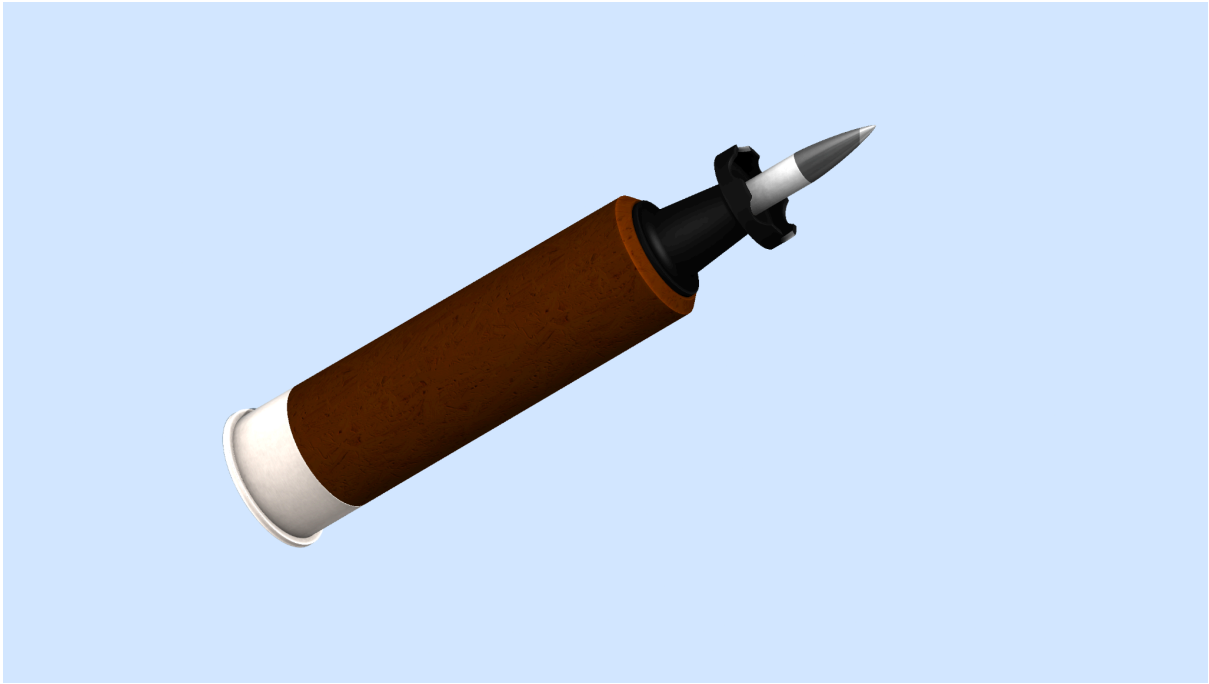
A bore evacuator purges the toxic gases from the cannon using its own residual gas pressure, dramatically reducing crew fatigue and improving fightability.

Besides the muzzle brake, the XG-47E5-2 is compensated by a triple-recoil setup using one concentric hybrid recoil dampener with both hydraulic and mechanical spring elements, and two longitudinal hybrid dampeners. The recoil stroke of the XG-47E5-2 is 14 inches.

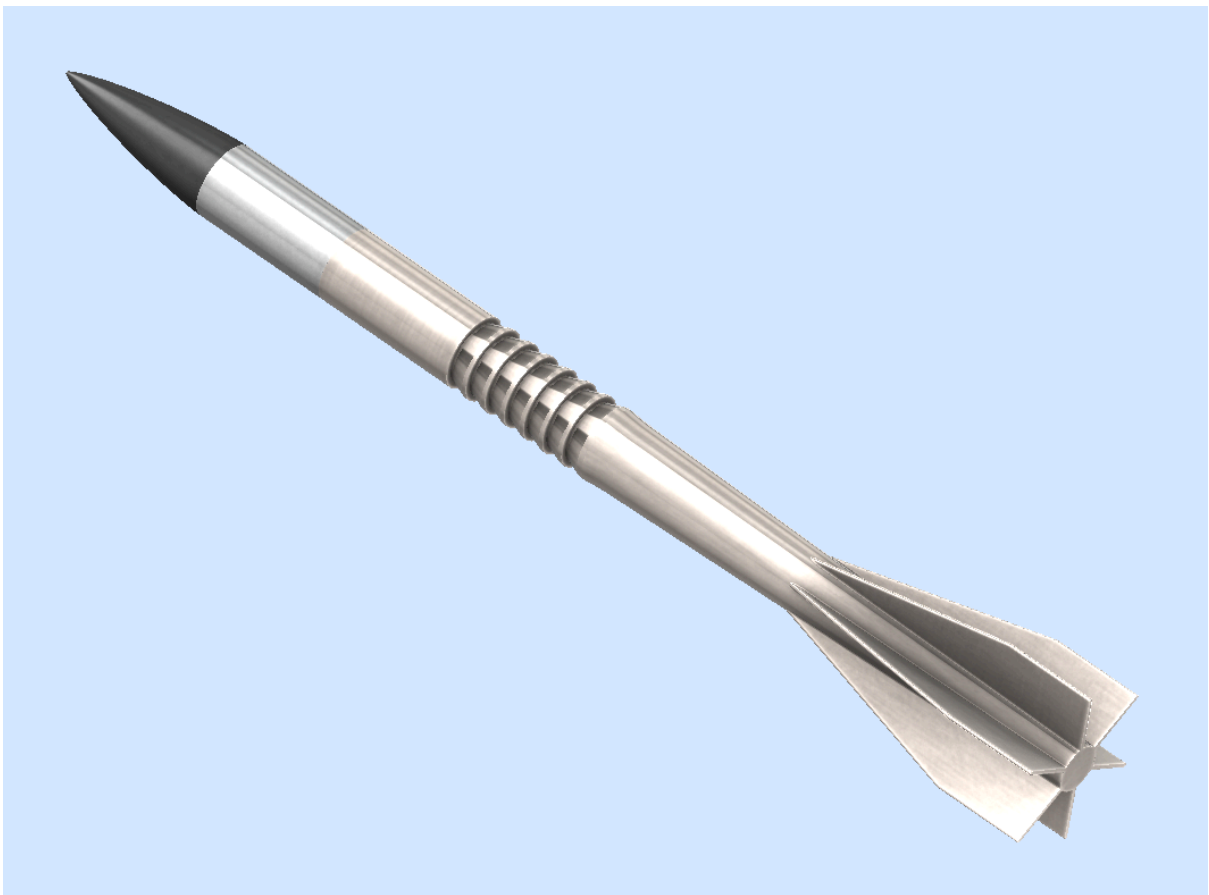
The gun as mounted in the XG-48E3 can elevate 20 degrees from horizontal, or depress 10 degrees. At full depression, the turret can rotate through an arc of 243.2 degrees.

The XG-47E5 family of cannons has been tested with Armor Piercing Flechette (APF), High Explosive Anti-Truck (HEAT), and High Explosive (HE) ammunition.

The primary ammunition of the XG-47E5-2 is the G-147J APF round. This round penetrates over 21 inches of rolled homogeneous armor thickness sloped at 60 degrees from vertical, at 2,000 yards. The round consists of a windscreen, depleted uranium penetrator, and high strength steel stem, carrying grooves, and fin unit. Muzzle velocity is 4,760 ft/s, and the flight projectile weighs 17 lb. The sabot is fully stabilizing, allowing for a much lower drag flight projectile which loses only 130 ft/s per 1,000 yd, versus what would be possible with a bore-riding fin design.



*Above: The complete XG-147J APF round.*



*Above: The flight projectile for XG-147J APF ammunition. Note the three-piece construction.*

Load Computer <i>(this input column)</i>		Pressure Computer <i>(both input columns)</i>		<i>(related outputs)</i>	
<a href="#">Case Capacity</a>	<input type="text" value="188537.009"/> gn	<a href="#">Charge</a>	<input type="text" value="153627.8"/> gn	<a href="#">Seating Depth</a>	<input type="text" value="2.00"/> in
<a href="#">Case Length</a>	<input type="text" value="23.75"/> in	<a href="#">Velocity</a>	<input type="text" value="4762"/> fps	<a href="#">Net Capacity</a>	<input type="text" value="178637.0"/> gn
<a href="#">Cartridge Length</a>	<input type="text" value="35.47"/> in		<i>(output)</i>	<a href="#">Bullet Travel</a>	<input type="text" value="203.3"/> in
<a href="#">Bullet Length</a>	<input type="radio"/> <input type="radio"/> <input type="text" value="13.72"/> in <input checked="" type="radio"/>	<a href="#">Pressure</a>	<input checked="" type="checkbox"/> <input type="text" value="56500"/> CUP	<a href="#">Expansion Ratio</a>	<input type="text" value="6.5"/>
<a href="#">Bullet Weight</a>	<input type="text" value="163275"/> gn			<a href="#">Mass Ratio</a>	<input type="text" value="0.941"/> gn/gn
<a href="#">Bullet Diameter</a>	<input type="text" value="5.000"/> in			<a href="#">Sectional Density</a>	<input type="text" value="0.933"/> lb/in/in
<a href="#">Barrel Length</a>	<input type="text" value="225"/> in		<i>(warnings)</i>	<a href="#">Relative Capacity</a>	<input type="text" value="36.62"/> in
	<i>(outputs)</i>		<input type="text"/>	<a href="#">Quickness</a>	<input type="text" value="33"/>
<a href="#">IMR Powder</a>	<input type="text" value="Much slower than 4831"/>		<input type="checkbox"/> <a href="#">disable help pop-ups</a>	<a href="#">Loading Density</a>	<input type="text" value="0.86"/> gn/gn
<a href="#">Charge</a>	<input type="text"/>	<a href="#">Pressure</a>	<input type="text" value="70000"/> psi	<a href="#">Kinetic Energy</a>	<input type="text" value="8213241"/> ft-lb
<a href="#">Velocity</a>	<input type="text"/>			<a href="#">Efficiency</a>	<input type="text" value="28.9"/> %
	<a href="#">Cartridges:</a> <input type="button" value="list"/>	<a href="#">Bullets:</a> <input type="button" value="list"/>	<a href="#">Examples:</a> <input type="button" value="1"/> <input type="button" value="2"/> <input type="button" value="3"/> <input type="button" value="4"/> <input type="button" value="5"/> <input type="button" value="6"/> <input type="button" value="7"/>		

### A Powley Computer for Handloaders

## Penetration Calculator

Use the calculator on this page to estimate penetration for armour piercing projectiles. Read a bit more about the equations and see an example [here](#).

<b>Estimate:</b>	
<a href="#">Caliber</a>	<input type="text" value="40"/> mm
<a href="#">Mass</a>	<input type="text" value="7.7"/> kg
<a href="#">Velocity</a>	<input type="text" value="1372"/> m/s
<a href="#">Penetration</a>	<input type="text" value="537"/> mm
<b>Reference (DeMarre only):</b>	
<a href="#">Caliber</a>	<input type="text" value="50"/> mm
<a href="#">Mass</a>	<input type="text" value="5.515"/> kg
<a href="#">Velocity</a>	<input type="text" value="1227"/> m/s
<a href="#">Penetration</a>	<input type="text" value="284"/> mm
<input type="button" value="Calculate (Krupp)"/>	<input type="button" value="Calculate (DeMarre)"/>

HEAT ammunition has been tested with the XG-47E5. However, this ammunition had significantly inferior performance in testing to the G-147J APF round, being capable of only around 18 inches of penetration, and being much more sensitive to angular impacts, and differential armor arrays such as those already incorporated into the XG-48E5 *Comanche*. Therefore, it is recommended that more funding be allocated for development of HEAT ammunition in the future, and that specialized HEAT types be developed for use against other targets.

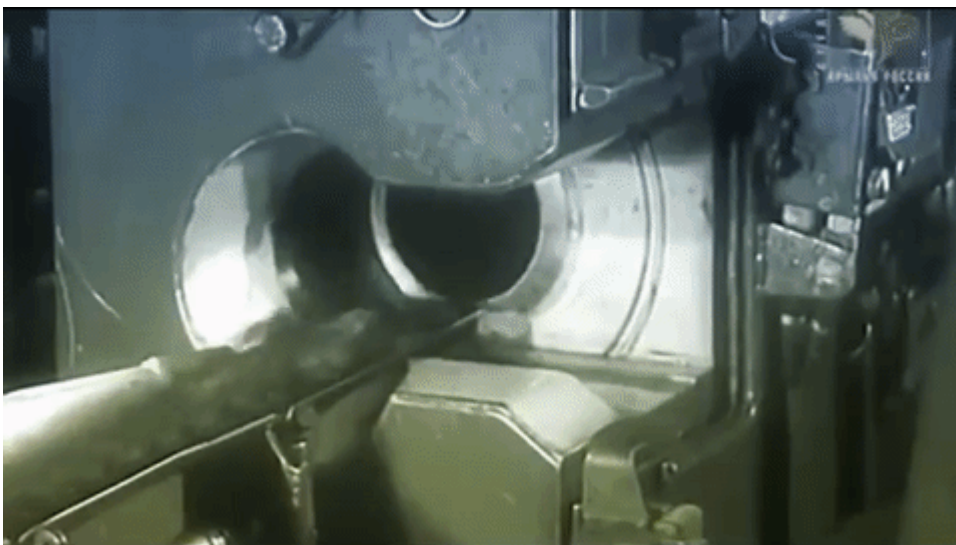
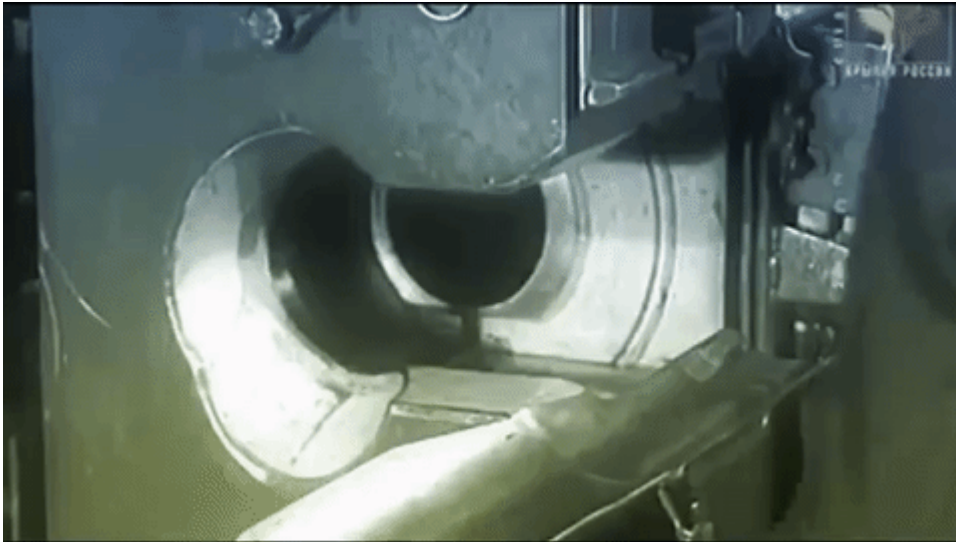
High Explosive ammunition tested with the XG-47E5 is of very conventional design, with an explosive charge of 160 ounces, and a muzzle velocity of 3,420 ft/s. Due to the HE projectile's 52 lb weight, this ammunition so far has been two-piece loaded.

<b>Load Computer</b> <i>(this input column)</i>		<b>Pressure Computer</b> <i>(both input columns)</i>		<i>(related outputs)</i>	
<a href="#">Case Capacity</a>	<input type="text" value="188537.009"/> gn	<a href="#">Charge</a>	<input type="text" value="153627.8"/> gn	<a href="#">Seating Depth</a>	<input type="text" value="2.00"/> in
<a href="#">Case Length</a>	<input type="text" value="23.75"/> in	<a href="#">Velocity</a>	<input type="text" value="3420"/> fps	<a href="#">Net Capacity</a>	<input type="text" value="178637.0"/> gn
<a href="#">Cartridge Length</a>	<input type="text" value="35.47"/> in		<i>(output)</i>	<a href="#">Bullet Travel</a>	<input type="text" value="203.3"/> in
<a href="#">Bullet Length</a>	<input type="radio"/> <input type="radio"/> <input type="text" value="13.72"/> in <input checked="" type="radio"/>	<a href="#">Pressure</a>	<input checked="" type="checkbox"/> <input type="text" value="56500"/> CUP	<a href="#">Expansion Ratio</a>	<input type="text" value="6.5"/>
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<a href="#">Bullet Diameter</a>	<input type="text" value="5.000"/> in			<a href="#">Sectional Density</a>	<input type="text" value="2.061"/> lb/in/in
<a href="#">Barrel Length</a>	<input type="text" value="225"/> in		<i>(warnings)</i>	<a href="#">Relative Capacity</a>	<input type="text" value="36.62"/> in
	<i>(outputs)</i>	<input type="text"/>		<a href="#">Quickness</a>	<input type="text" value="29"/>
<a href="#">IMR Powder</a>	<input type="text" value="Much slower than 4831"/>	<input type="checkbox"/> disable help pop-ups		<a href="#">Loading Density</a>	<input type="text" value="0.86"/> gn/gn
<a href="#">Charge</a>	<input type="text"/> gn	<a href="#">Pressure</a>	<input type="text" value="70000"/> psi	<a href="#">Kinetic Energy</a>	<input type="text" value="9355833"/> ft-lb
<a href="#">Velocity</a>	<input type="text"/> fps			<a href="#">Efficiency</a>	<input type="text" value="32.9"/> %
	<a href="#">Cartridges:</a> <input type="button" value="list"/>	<a href="#">Bullets:</a> <input type="button" value="list"/>	<a href="#">Examples:</a>	<input type="button" value="1"/> <input type="button" value="2"/> <input type="button" value="3"/> <input type="button" value="4"/> <input type="button" value="5"/> <input type="button" value="6"/> <input type="button" value="7"/>	

### A Powley Computer for Handloaders

The XG-47E5 5in/24 cannon is a semi-automatically loaded weapon. The XG-48E3 *Comanche* has a separate human loader, however he is provided with many conveniences to allow him to continue to fight at full capacity for very long periods, and to allow the XG-48 to operate at reduced crew if necessary. First of these is an ammunition magazine which is automated. The loader simply presses the button and the magazine rotates automatically via a hydraulic mechanism to present the correct round. These buttons are within reach of both the loader and the commander from their natural positions in the tank. Round identification is done using the overall length of each round via a set of flipper switches. A 7-round ready rack is also provided in the turret, which allows for the loader to maximize rate of fire by prepping several rounds in series and eliminate the magazine function entirely. These ready rounds can be fed from the magazine during down periods, or they can be prepped during resupply. At least 10 more rounds can also be stowed in various locations around the turret basket and hull, for maximum sustainability.

Once a round is selected, the loader grabs it in hand, and sets it in a tray which is placed conveniently at waist height. He then pushes the loading button located to his right, and a rigid chain rammer emerges and rams the entire round into the breech closing it, and the gunner is automatically notified that he is ready to fire. The loader's chair is both stowable and adjustable, and the loading tray is placed in a position which is also convenient for lap loading. Very little physical exertion is necessary to load the main gun of the Comanche Battle-cruiser.



*Above: Loading procedure for the earlier two-piece ammunition XG-46 5in/30 cannon. The XG-47E5-2 uses single-piece ammunition with combustible cases, and therefore combines the two loading steps for higher rates of fire.*

The main armament of the XG-47E3 *Comanche* Battle-cruiser is fully stabilized in two axes via electrohydraulic systems driven by a 150 horsepower auxiliary power unit (APU). During movement, the gun may be automatically slaved to the target via the stabilization and reference system and used to put precise shots on target day or night. During testing, this has been accomplished at speeds of up to 30 mph without major deficits in accuracy.

Secondary armament consists of 1x .30 caliber G-17A5T coaxial machine gun and 1x .50 caliber G-19A2T coaxial machine gun, which are slaved to the main gun. Independent armament consists of 1 additional G-17A5 and 1 additional G-19A2 machine gun, and 2 dual close-in .40 caliber G-346E1 machine guns. The four G-346E1 machine guns are connected to a "joystick" along the turret roof, which has a pressure sensitive handle and firing switch. As needed, the gunner can engage the switch and fire either or both sets of twin machine guns along a 120 degree horizontal arc (to each side) and a 20 degree vertical arc,

controlled by the location of the handle in the forward and rear vector and up and down vectors. Sighting is conducted via optical periscopes slaved to the guns. Each machine gun has a rate of fire of 1,200 rounds per minute, for a combined rate of fire of 2,400 rounds per minute (each side). Ammunition stowage is 1,200 rounds of .50 caliber ammunition, 10,000 rounds of .30 caliber ammunition, and 6,000 rounds of .40 caliber ammunition.