

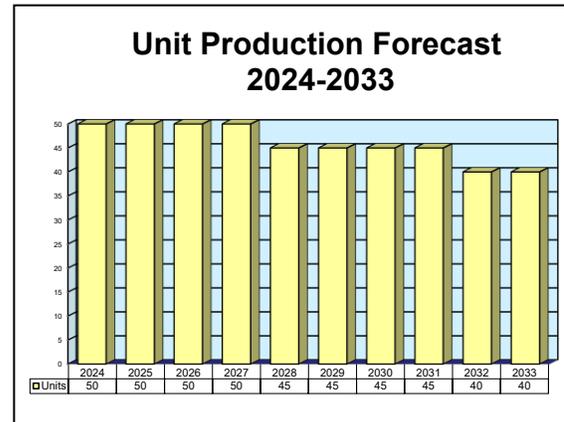
ARCHIVED REPORT

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Type 88 (PLZ45) 155mm Self-Propelled Howitzer

Outlook

- Serial production of the Type 88 (PLZ45) for PLA procurement began in 2007
- Beyond the completed Kuwaiti (54 tubes) and Saudi Arabian (27 tubes) contracts, there are unconfirmed reports of sales to Algeria, Bangladesh, and Pakistan
- Forecast reflects serial production for PLA procurement and possible export



Orientation

Description. A tracked 155mm self-propelled artillery system.

Sponsor. The Ministry of National Defense of the People's Republic of China sponsors the development and PLA procurement of the Type 88 (PLZ45).

Licensees. None.

Status. Development through serial production.

Total Produced. Through 2023, we estimate the Chinese State Arsenals system (under the auspices of NORINCO) produced 1,268 Type 88 (PLZ45) self-propelled artillery systems.

Application. Mobile indirect fire artillery support for maneuver forces at the battalion through division levels.

Price Range. In 2024 U.S. dollars, the Type 88 (PLZ45) self-propelled howitzer carries an estimated unit price of \$5.23 million.

Contractors

Prime

China North Industries Corp (NORINCO)

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Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 75 Glen Road, Suite 302, Sandy Hook, CT 06482, USA; rich.pettibone@forecast1.com

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Technical Data

Crew. Five: commander, gunner, two loaders, and driver.

Muzzle Brake. Slotted baffle.

Recoil System. Hydropneumatic.

Breech Mechanism. Semi-automatic horizontal-sliding wedge block.

Ammunition. This artillery system is compatible with all NATO-standard 155mm ammunition. The Chinese specifically designed the Type 88 (PLZ45) to fire Extended Range Full Bore (ERFB) ammunition.

The PRC also produces an indigenous line of specialized 155mm ammunition in several types, including:

- High Explosive
- Improved Conventional Munition (submunition dispensing)
- White Phosphorous Smoke
- Illumination

These munitions are available in standard Extended Range Full Bore and Extended Range Full Bore / Base Bleed patterns.

Armor. Conventional steel alloy armor, 11mm (0.44 in) thick over the frontal arc and turret sides. The armor suite provides protection from small-arms fire and ballistic fragments.

Dimensions. The following data reflect the production-standard Type 88 (PLZ45), as delivered to Kuwait. The height is to the roof of the turret; the fuel capacity is estimated.

	<u>SI Units</u>	<u>U.S. Units</u>
Length overall	10.15 m	33.30 ft
Width	3.23 m	10.07 ft
Height	2.60 m	8.53 ft
Combat weight	32.02 tonnes	35.30 tons
Fuel capacity	890 liters	236.7 gal
Ordnance caliber	155 mm	6.10 in

Performance. The maximum speed and vehicle range data reflect use on a paved road. Although the turret can traverse 360 degrees, the normal firing arc limits are 3 degrees left and 30 degrees right of the vehicle's centerline. The maximum-range data for the 155mm 45-caliber ordnance reflects firing ERFB/Base Bleed High Explosive projectiles.

	<u>SI Units</u>	<u>U.S. Units</u>
Maximum speed	56 km/h	34.8 mph
Maximum range	448 km	278.2 stat mi
Step	70 cm	2.29 ft
Trench	2.7 m	8.86 ft
Slope	46.6%	46.6%
Gradient	62.5%	62.5%
Fording	1.2 m	3.94 ft
Elevation	+72 deg	+72 deg
Depression	-3 deg	-3 deg
Traverse	360 deg	360 deg
Maximum ordnance range	39 km	42,650.4 yd
Maximum rate of fire	5 rounds/m	5 rounds/m
Sustained rate of fire	2 rounds/m	2 rounds/m

Engine. Deutz BF12 L413FC air-cooled, supercharged diesel engine. This powerplant generates 391.5 kilowatts (525 hp), with a power-to-weight ratio of 12.23 kilowatts per tonne (17.87 hp/ton). The system also features a diesel auxiliary power unit.

Gearbox. Manual constant mesh gearbox, with one reverse and six forward gears.

Suspension and Running Gear. Torsion bar suspension, with six dual-tire roadwheels and three track return rollers on each side. Each roadwheel station mounts a hydraulic shock damper. The drive sprocket mounts at the front of the hull; the rear roadwheel acts as the idler.

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Fire Control. As the Type 88 (PLZ45) is an indirect-fire system, targeting data originate with the forward observer, passing through a fire direction center command post before reaching the individual Type 88 (PLZ45). The system features an inertial direction

finder, along with a gun point and display unit. The system is also compatible with a GPS receiver. An indirect-fire sight mounts an armored cupola on the turret roof. The fire control system also features a direct-fire telescope.

Variants/Upgrades

Variants. The PCZ45 ammunition-resupply vehicle shares the Type 88 (PLZ45) chassis. The PCZ45 carries a total of 90 projectiles and charges. An integral conveyer mechanism can transfer ammunition to the Type 88 (PLZ45) at a rate of eight rounds per minute.

A roof-mounted crane and reload hatch facilitate replenishment of pallet-mounted ammunition loads.

Modernization and Retrofit Overview. Not applicable at the present time.



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Source: China North Industries Corporation (NORINCO)

Program Review

Background. In the mid-1980s, the People's Republic of China began development of a new self-propelled artillery system capable of taking advantage of NATO-pattern 155mm Extended Range Full Bore (ERFB) 45-caliber ordnance technology.

Going to the Source

Working closely with the inventor of the ERFB technology (the late Dr. Gerald Bull) and his staff, the Chinese conducted the development program at the 123 Factory, 127 Factory, 674 Factory, and Beijing University of Science and Technology. The first operational product of this program was the 155mm WA 021, a towed 45-caliber artillery piece. The self-propelled Type 88 program began in 1985. The PRC first revealed the new system in 1988.

The designation PLZ45 first appeared with the 1997 sale of this system to Kuwait, as part of NORINCO's marketing effort to offer the Type 88 and its support components as a complete system (see below). The PLA continues to use the Type 88 designation.

Description. Despite export deliveries to Kuwait, only limited data are available concerning the Type 88 (PLZ45) system.

Conventional Layout

In general layout, the Type 88 (PLZ45) resembles the BAE Systems Land & Armaments (formerly United Defense LP) M109 series self-propelled howitzer, featuring an all-welded steel-alloy armor turret and hull on a heavy tracked chassis. The driver sits to the left-front of the hull; the engine and gearbox mount the

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right-front. The driver's station features a single-piece hatch cover and two periscopes; one periscope is interchangeable with a night vision device.

The turret mounts on the rear of the vehicle. The commander sits to the right of the ordnance; the gunner sits to the left. The commander's cupola features a single-piece hatch cover and five periscopes. The cupola also provides access to a pintle-mounted 12.7x107mm machine gun. The turret features a large access door on each side and a small access door at the rear. The rear of the hull also features a large door for crew access and ammunition resupply. The Type 88 (PLZ45) carries 30 rounds of 155mm ammunition (projectiles and charges) and 400 rounds of 12.7x107mm machine gun ammunition.

Modern Fire Control Suite

The 155mm ordnance features a semi-automatic loader and a hydraulic ramming system; both components are electrically controlled. The fire control suite includes an inertial direction finder, a GPS receiver, a laser rangefinder, and a gun display unit. Gun laying (aiming) can be automatic or manual. The Type 88 (PLZ45) features the Type A-220A radio as standard equipment. The Chinese will install other radios upon request.

PLZ45 Package Deal

NORINCO offers the Type 88 (PLZ45) as the centerpiece of a complete artillery system package of battery and battalion sets. In addition to the Type 88 (PLZ45) self-propelled howitzers, the sets include:

- The PCZ45 ammunition-resupply vehicle
- The ZCY45 battalion command post vehicle
- The ZCL45 battery command post vehicle
- The Type 84 engineer and recovery vehicle
- Two artillery observation and reconnaissance vehicles
- Several optional support vehicles

Production and delivery schedules indicate that Kuwait probably purchased three PLZ45 battalion sets, with each set consisting of three six-gun batteries. In August 2008, Saudi Arabia signed a contract with NORINCO for "one battalion" of PLZ45 systems. The Saudis reportedly intended to primarily use this first battalion set for evaluations, with an option for a follow-on purchase of a second set.

Funding

The Ministry of National Defense of the People's Republic of China funds the development and PLA procurement of the Type 88 (PLZ45).

Contracts/Orders & Options

Contractual information generally is not available. However, the September 1997 contract with Kuwait for 27 systems was reportedly worth \$150 million. Information concerning the 2001 follow-on contract remains unavailable.

In Aug 2008, open-source reporting indicated that Saudi Arabia had signed a contract of undisclosed value with NORINCO for procurement of "one battalion" (27 tubes) of PLZ45 systems. The contract also reportedly allowed for an option on an additional battalion, pending the results of Saudi operational evaluations.

Worldwide Distribution/Inventories

Export Potential. Although the People's Republic of China is a relatively unknown force in the international self-propelled artillery market, the 1997 and 2001 export sales to Kuwait captured considerable attention. While international politics – the PRC's support of Kuwait in the U.N. – may have had more influence on the sale than mere technical considerations, the fact remains that Kuwait selected the Type 88 (PLZ45) over the leading 155mm systems available.

Confirmed export sales to two customers will hardly transform the Type 88 (PLZ45) into a dominant force in the international self-propelled artillery market. Nevertheless, these sales establish the NORINCO Type 88 as a player in the market, with the potential for further export sales in the foreseeable future.

Countries. Algeria; Bangladesh; Kuwait; Pakistan; People's Republic of China; Saudi Arabia.

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Forecast Rationale

Full-rate serial production of the Type 88 (PLZ45) self-propelled howitzer is ongoing for procurement by the People's Liberation Army and limited export.

PLA Modernization

The PLA continues to pursue an ambitious force transformation effort, with the goal of replacing much of its aging armor and artillery inventories.

The performance of the Type 88 (PLZ45) reportedly impressed the PLA during the system's operational evaluation. The PLA is fielding the Type 88 as a modern replacement for at least some of the service's increasingly archaic ISU-152 and Type 83 self-propelled howitzers.

Export Market

Since 1997, the People's Republic of China has sold 54 PLZ45 systems to Kuwait and "one battalion"

(27 systems) to Saudi Arabia. In January 2014, open-source reporting indicated that Algeria had received an unspecified quantity of PLZ45 systems (this remains unconfirmed). Unconfirmed reports also suggest that Bangladesh and Pakistan have also acquired PLZ45 systems from NORINCO.

Although we do not expect the Type 88 (PLZ45) to become a dominant force on the international market, the system's successful entrance into the market does signal the possibility – if not a great likelihood – that the system will secure a moderate level of export sales in the future.

Nevertheless, PLA procurement will continue to dominate the Type 88 (PLZ45) production line.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program	Thru 2023	High Confidence				Good Confidence			Speculative			Total
		2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	
China North Industries Corp (NORINCO)												
Type 88 (PLZ-45) <-> China												
	1,268	50	50	50	50	45	45	45	45	40	40	460
Total	1,268	50	50	50	50	45	45	45	45	40	40	460