

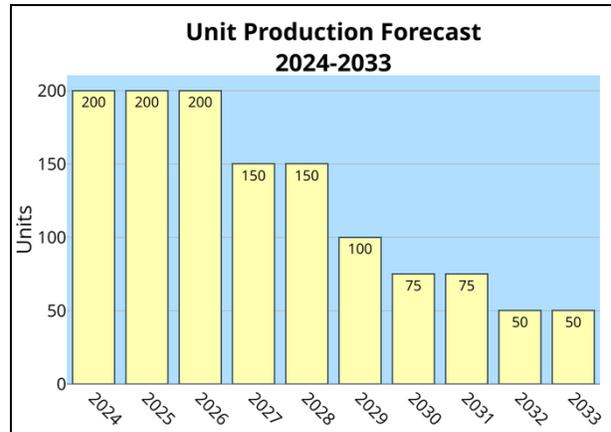
ARCHIVED REPORT

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Panzerfaust 3/Bunkerfaust

Outlook

- Dynamit Nobel considers Panzerfaust 3 production in Ukraine
- The German Army ordered 3,500 Panzerfaust 3-ITs in July 2022
- Germany delivers 1,000 Panzerfaust 3s to support Ukraine's war effort in 2022



Orientation

Description. A man-portable anti-armor, shoulder-launched weapon.

Sponsor. The German Bundeswehr sponsored the initial development and Bundeswehr procurement of the Panzerfaust 3 (PzF 3).

Status. Development through serial production.

Total Produced. Through 2023, we estimate that the prime contractor produced approximately 272,787 Panzerfaust 3 launchers.

Application. A lightweight, man-portable, shoulder-fired anti-armor and multipurpose weapon system.

Price Range. In 2022 U.S. dollars, the basic Panzerfaust 3 launcher carries a unit price of \$9,994. The IT 600 version (with the Simrad Optonics computerized sight) carries a unit price of \$11,108.

The basic 110mm High Explosive Anti-Tank (HEAT) munition carries a unit price of \$297; the Bunkerfaust munition costs \$202.

Contractors

Prime

Dynamit Nobel Defence GmbH	https://www.dn-defence.com , Dr. Hermann Fleck Alee 8, Burbach, Germany, Tel: + 49 2736 46 2014, Fax: + 49 2736 46 2107, Email: info@dn-defence.com , Prime
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Subcontractors

Diehl Stiftung & Co KG	https://www.diehl.com , Hauptverwaltung, Stephanstrasse 49, Nuremberg, Germany, Tel: + 49 911 947 2492, Email: info@diehl.de , (Barricade and Street Encounter Grenade)
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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

Design Features. The Panzerfaust 3 is an over-caliber weapon operating on the Davis principle. It offers considerable flexibility in terms of ammunition options.

Dimensions. The data for the projectiles reflects the basic DM12 HEAT round; data for the Bunkerfaust round is in parentheses where different. As this is an over-caliber system, the projectile diameter is at its widest point. The total diameter includes the launch tube.

	<u>SI Units</u>	<u>U.S. Units</u>
Projectile length	67.2 cm (not known)	26.45 in (not known)
Transport length	1.23 m	4.35 ft
Firing length	1.35 (1.27) m	4.43 (4.16) ft
Projectile diameter	110 mm	4.41 in
Total diameter	64 mm	2.52 in
Projectile weight	3.9 (4.35) kg	8.59 (9.57) lb
Total weight	12.1 (12.6) kg	26.42 (27.12) lb
Cone standoff	3.23 cal (not known)	3.23 cal (not known)

Performance. The armor perforation data reflects application of our standardized formula to the DM12 HEAT warhead. A 125mm warhead, with an armor perforation rating of 78.75 centimeters (31 in), is in development. The data for the Bunkerfaust munition is in parentheses.

	<u>SI Units</u>	<u>U.S. Units</u>
Speed	250 (218) mps	820.2 (715.2) fps
Altitude	Line of sight	Line of sight
Range	400 m	437.4 yd
Armor perforation	69.3 (1.7) cm	27.28 (0.67) in

Propulsion. The Panzerfaust 3 operates on the Davis recoilless principle, employing iron powder as the countermass. The propulsion system uses two separate solid-fuel rocket components.

- The first provides the initial impulse to push the projectile out of the tube and accelerate it to an initial velocity of 165 meters per second (541.33 fps).
- Once the projectile is a safe distance from the launcher, a conventional rocket motor at the rear of the projectile ignites, accelerating the projectile to its full speed. The Bunkerfaust munition is similar, but the maximum speed is somewhat lower.

Launcher Mode. The Panzerfaust 3 and Bunkerfaust projectiles launch from a spiral-wound, glass-fiber-reinforced plastic tube located within a disposable aluminum tube. The reusable firing mechanism consists of a cheek pad, a battery, a sight, a grip, and firing components.

Control & Guidance. After exiting the launch tube, seven folding fins at the rear of the projectile deploy to provide aerodynamic stabilization in flight. The Bunkerfaust projectile features 10 fins.

Warhead. Initially, the 110mm DM12 HEAT round was the only available munition for the Panzerfaust 3. The 3.8-kilogram (8.36-lb) DM12 features a 106mm (4.17-in) shaped-charge component. Subsequently, contractors developed other warheads (including multipurpose fragmentation, illumination, and smoke) for the Panzerfaust 3. The follow-on HEAT rounds generally achieve adequate penetration via a standoff probe. The latest HEAT round, still in development, features a 125mm warhead.

Tandem Warhead Available

The Panzerfaust 3T warhead is a tandem-shaped charge optimized to defeat explosive reactive armor (ERA). This warhead reportedly provides armor perforation greater than 70 centimeters (27.56 in).

More recently, the prime contractor introduced the IT 600 warhead, which is essentially a 3T warhead integrating a solid rocket motor to extend the range to 600 meters (656.2 yd). This munition is optimized for use with the Panzerfaust 3 IT 600 launcher, which features the Simrad Optronics IS 2000 computerized sight. The contractor reports that the IT 600 warhead can perforate 90 centimeters (35.43 in) of armor.

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For the Panzerfaust 3 LW, the contractor developed a new lightweight 90mm HEAT warhead weighing 3 kilograms (6.6 lb).

Dynamit Nobel developed a further advanced-design tandem HEAT warhead for the British Army's NLAW (Next generation Light Anti-tank Weapon) competition. The contractor based the new warhead, designated Panzerfaust 3N, on the 3T and IT 600; it features a rocket motor for greater range. The contractor claims the warhead can defeat any current or future main battle tank from any aspect. Nevertheless, in 2002, the MBT LAW (Main Battle Tank Light Anti-armour Weapon) won the British Army NLAW competition.

Switzerland (in conjunction with the U.S. firm Physics International) has developed a new 124mm HEAT round for the Swiss Army's Panzerfaust 3 inventory. Based on RUAG's Modular Explosive Penetrator technology, the 3.9-kilogram (8.58-lb) warhead reportedly features an effective range of 400 meters (437.4 yd) against stationary targets and 300 meters (328 yd) against moving targets.

Enter the Bunkerfaust

In 1993, information surfaced that Rafael (Haifa, Israel) was working with Dynamit Nobel on the development of an extended-range guided round for the Panzerfaust 3. The new round reportedly mates an improved ogive with a laser seeker to the standard projectile. The round also features a "bang-bang" actuator and two canard control surfaces along with the electronics module.

Four wings with laser radiation detectors at their tips mount at the rear of the ogive. A laser illuminator mounts on the launcher. Upon launch of the projectile, the guidance component senses its deviations from the projected laser beam and issues course-correction commands to the aerodynamic control surfaces. This new projectile has not yet appeared on the market.

Enter the Bunkerfaust

In 1995, Diehl introduced the Barricade and Street Encounter Grenade for use against field fortifications and in urban areas. The Barricade and Street Encounter Grenade munition features a two-element warhead.

- The main charge is a conventional 110mm standoff fuzed HEAT warhead intended to perforate buildings and other structures.
- The secondary charge is a 47mm High Explosive Fragmentation (HE-Frag) grenade, which penetrates the target through the hole created by the HEAT warhead. An electronic fuze mechanism detonates the grenade.

Development of this new round was completed in 1997. The Panzerfaust 3 launcher firing the Barricade and Street Encounter Grenade is the basis of the so-called Bunkerfaust. The Bundeswehr is reportedly procuring the Bunkerfaust. The contractor offers it as an individual munition or with the launcher as a complete weapon.

Variants/Upgrades

Variants. Beyond the introduction of new ammunition types, the prime contractor offers a line of distinct Panzerfaust 3 launcher models, as follows:

<u>Designation</u>	<u>Description</u>
Panzerfaust 3	Basic launcher. See Technical Data , above.
Panzerfaust 3 IT 600	Panzerfaust 3 launcher mounting Simrad Optronics IS 2000 computerized sight with a laser rangefinder and an infrared optical sight. Optimized to fire the IT 600 warhead.
Panzerfaust 3 LW	A lightweight version of the Panzerfaust 3 launcher, optimized for use by airborne, quick reaction, and similar units. Fires a lighter (3-kg/6.6-lb) 90mm HEAT munition.
Bunkerfaust	Panzerfaust 3, optimized to fire the Barricade and Street Encounter Grenade munition.
Fire Salamander	An autonomous firing unit mounting four Panzerfaust 3 weapons around a central command module. This module can integrate several types of target detection systems for a fully autonomous anti-tank system. Alternatively, it can mount an electro-optical viewing system for remote operation. A similar development is the Panzerfaust off-route mine system, which integrates a single Panzerfaust launcher with the Honeywell SIRA acoustic/infrared sensor.

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Modernization and Retrofit Overview. Not generally applicable. The contractor integrates product improvements as production cut-ins.



Panzerfaust 3 Anti-Armor Weapon

Source: Dynamit Nobel Defence

Program Review

Background. In 1976, the Federal Republic of Germany's Ministry of Defense requested the development of a new shoulder-launched anti-armor weapon to replace the Panzerfaust 44 2A1 (Panzerfaust Lanze), which was no longer effective against modern armored vehicles.

New Bundeswehr Requirements

In order to meet the future demands of the Bundeswehr, the request specified that the new weapon meet a number of tactical requirements, as follows:

- High kill probability against the frontal arc of all current and expected tanks.
- Capability to fire from an enclosed space.
- Lower cost than other new designs of this type.
- Range of 300 meters against moving and 400 meters against stationary targets.
- Weight not to exceed 12 kilograms (26.4 lb).
- Length less than 120 centimeters (47.24 in) in traveling configuration or 130 centimeters (51.18 in) when ready to fire.
- Disposable launch tube. Minimal training requirements.

Dynamit Nobel initiated the development of the new weapon in 1978. The contractor rejected the basic recoilless rifle technology of weapons such as the Carl Gustaf because of weight and backblast and because such weapons are generally not disposable. The contractor also rejected the long-proven and widely used solid rocket principle due to its large signature

(blast, smoke, and flash), which renders it unsuitable for firing within enclosed spaces.

Back to the Davis Principle

Dynamit Nobel ultimately returned to the origins of the recoilless rifle for the answer. The Davis principle, originally used for recoilless aircraft guns in World War I, achieves recoilless operation by firing a countermass equal to the projectile weight to the rear. The only drawback is that the system must weigh somewhat more due to high internal pressures. The advantages of the Davis system are:

- The warhead can be of a greater diameter than the launch tube.
- The system only requires a small amount of propellant to eject the projectile from the launcher.
- The launcher can safely fire in an enclosed space.

The contractor also investigated a modified Davis principle, like that of the Armbrust and the now-defunct Jupiter/AC300 anti-tank weapons, that employs the Antonin sliding piston system. However, the cost of this system precluded its selection in favor of the unmodified Davis principle. For a discussion of the Davis and Antonin systems, see Appendix I of this forecast, "Glossary of Military Vehicle/Ordnance/Munitions Technology."

Description. The Panzerfaust 3 exhibits a close relationship to the Panzerfaust 44 2A1 (Lanze), which remains in service with Bundeswehr Reserve units. Both are essentially improved versions of the German Wehrmacht's original Panzerfaust, which entered service in 1943.

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Panzerfaust 3 consists of two primary components:

- The munition, in a sealed, disposable launch tube
- The reusable sighting/firing mechanism, which attaches to the launch tube

Sequence of Operation

After the operator attaches the sighting/firing mechanism to the disposable launch tube, he extends the pistol grip, acquires the target through the sights, and activates the pistol-grip-mounted safety lever. Pressing the trigger activates a conventional firing pin system to ignite the munition propellant charge. The firing pin system includes an automatic backup, which activates if the primary system fails.

The rocket in the launch tube can only ignite via the attached firing mechanism, with the pistol grip extended

and the safety lever activated. The Panzerfaust 3 also features a drop-lever safety to prevent ignition if the operator accidentally drops the weapon.

In storage, the launcher and ammunition require minimal maintenance and service. To date, the Panzerfaust 3 has met or exceeded all Bundeswehr design requirements.

One of the Best

While the U.S. Army considers an over-caliber system such as the Panzerfaust 3 to be unsafe, the Germans and Russians have used this technology for well over a half century with great success. The continued development of the new munitions for the Panzerfaust 3 will ensure its reputation as one of the premier anti-tank weapons in the world for years to come.

Funding

The Federal Republic of Germany's Bundeswehr funds the development and procurement of the Panzerfaust 3. Export customers fund their respective programs.

Worldwide Distribution/Inventories

Export Potential. Despite the formidable anti-armor performance of the Panzerfaust 3, the weapon system continues to face vigorous sales competition from the growing number of anti-tank systems on the international market. France, Israel, Sweden, and the U.K. remain major players in this market segment. In addition, the Rosoboronexport organization of the Russian Federation continues to flood the market with several potent man-portable anti-armor systems at bargain-basement prices.

Countries. The Panzerfaust 3 has been sold to the following countries: **Germany, Italy, Japan, the Netherlands, Peru, Portugal, Switzerland**, and two unidentified nations. In addition, the Bundeswehr transferred 200 Panzerfaust 3 launchers to Kurdish Peshmerga forces in **Iraqi Kurdistan**. In February 2006, the **United Kingdom** ordered the Anti-Structures Munition variant of the Panzerfaust 3. **Croatia, Hungary**, and the **Republic of Korea** have been examining the Panzerfaust 3 for possible purchase.

Forecast Rationale

Over the next 15 years, Dynamit Nobel Defence GmbH is poised to maintain production and expand its Panzerfaust 3 anti-tank weapon line, benefiting from ongoing international demand and possible co-production ventures.

In recent years, interest in Panzerfaust 3 has surged, especially following its effective deployment against Russian tanks in Ukraine. This use case has solidified its reputation as a reliable anti-tank solution, likely sustaining demand from NATO allies and other European countries, particularly in Eastern Europe, where defense requirements are accelerating due to security tensions. With a German order in 2022 for an additional 3,500 units, the Bundeswehr remains a

reliable customer, and similar follow-on procurements are anticipated to continue through the decade.

Future prospects are further strengthened by the recently explored co-production agreement with Ukraine's Ukrainian Defense Industry JSC. This partnership, which may evolve from final assembly to licensed full production, would not only support Ukraine's defense needs but could also reduce manufacturing strain at Dynamit Nobel's German facility by expanding production capabilities.

Additionally, the company's ongoing development of the RGW 110, a lightweight successor with extended range, suggests that Dynamit Nobel will continue to market the Panzerfaust 3 in tandem with newer models.

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These efforts will allow Dynamit Nobel to capture short-term orders for Panzerfaust 3, with a likely transition to RGW 110 as the Bundeswehr and other forces seek next-generation anti-armor solutions. Thus, while the Panzerfaust 3 will remain relevant, it will gradually yield its market share to the more advanced

RGW 110 as both models are positioned within a complementary product strategy.

Contracts reflect a combination of launch units and rockets; Forecast International's estimates reflect launch unit production.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program		High Confidence				Good Confidence			Speculative			
	Thru 2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total
Dynamit Nobel Defence GmbH												
Panzerfaust 3 Tube												
	272,787	200	200	200	150	150	100	75	75	50	50	1,250
Total	272,787	200	200	200	150	150	100	75	75	50	50	1,250