

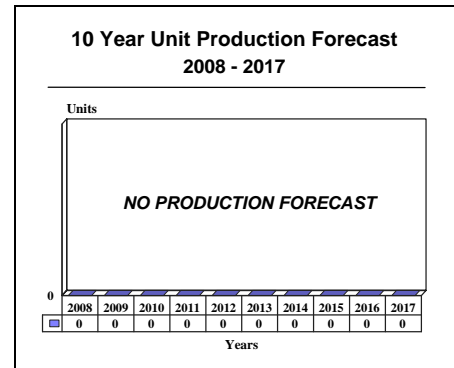
ARCHIVED REPORT

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AMX Leclerc – Archived 1/2009

Outlook

- (Then) Giat completed Leclerc production run for UAE in 2004; deliveries to French Army were reportedly complete in 2006
- Nexter (formerly Giat) continues to aggressively promote the Leclerc on the international market, albeit with only one confirmed export sale thus far
- Production forecast reflects lack of new orders at this point



Orientation

Description. A main battle tank.

Sponsor. The French Ministry of Defense, through the French Army, sponsors the development and French Army procurement of the AMX Leclerc.

Licensees. None

Status. Development through serial production.

Total Produced. Through 2007, the prime contractor produced 805 Leclerc tanks, including nine prototypes and two Tropicalized Leclerc contractor demonstration tanks.

Application. Armored mobile weapon systems, optimized for high-speed offensive and breakthrough operations, as well as defensive fire support.

Price Range. In 2006 U.S. dollars, the serial-production French Army Leclerc tank carried a unit price of \$8.502 million.

The United Arab Emirates paid a unit price of \$8.721 million for its 388 Leclerc tanks.

Contractors

Prime

Nexter Systems	http://www.nexter-group.fr , 11 Allée des Marronniers, Versailles, 78022 France, Tel: + 33 1 39 49 30 00, Fax: + 33 1 39 49 34 89, Email: presse@nexter-group.fr , Prime
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Subcontractor

Ansaldo STS (formerly CSEE Transport SA)	http://www.csee-transport.com , 4 avenue du Canada, BP 243, Les Ulis Cedex, 91944 France, Tel: + 33 1 69 29 65 65, Fax: + 33 1 69 29 07 07, Email: nadia.alves-pires@ansaldo-sts.fr (Weapon Control System)
Chausson (SA des Usines Chausson)	194 avenue des Gresillens, Asnieres-sur-Seine, 92606 France, Tel: + 33 1 40 80 97 00, Fax: + 33 1 40 80 97 50 (Engine Cooling System)
Compagnie Industrielle Des Lasers, CILAS	http://www.cilas.com , 8 avenue Buffon, BP 631, Orleans, 45063 France, Tel: + 33 02 38 64 15 55, Fax: + 33 02 38 76 02 49 (Laser Rangefinder & Other Fire)

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	Control Components)
Etienne-Lacroix	http://www.etienne-lacroix.com , 6 Blvd Joffrery, BP 30213, Muret, 31605 France, Tel: + 33 05 61 56 65 00, Fax: + 33 05 61 51 42 77, Email: sophie.cauvel@etienne-lacroix.com (Galix Vehicle Protection System)
Sagem Défense Sécurité SA	http://www.sagem-ds.com , Le Ponant de Paris, 27, rue Leblanc, Paris, 75512 France, Tel: + 33 1 40 70 63 63, Fax: + 33 1 40 70 66 40 (Gunner's Stabilized Sight)
Societe D'Equipements Systemes Et Mecanismes (SESM)	http://www.renk.biz , 67 rue d'Epluches, ZI D'Epluches, Saint Ouen-L'Aumone, 95315 France, Tel: + 33 1 34 48 37 00, Fax: + 33 1 34 64 55 43, Email: d.sepfonds.sesm@renk.biz (ESM 500 Gearbox)
Turbomeca SA	http://www.turbomeca.com , Bordes, 64511 France, Tel: + 33 5 59 12 50 00, Fax: + 33 5 59 53 15 12 (TM 307 Gas Turbine)
Wartsila France SAS	http://www.wartsila.com , 1 Rue De La Fonderie, BP 1210, Mulhouse, 68054 France, Tel: + 33 389 66 68 68, Fax: + 33 389 66 68 30 (V8X-1500 T9 Diesel Engine)

Comprehensive information on Contractors can be found in Forecast International's "International Contractors" series. For a detailed description, go to www.forecastinternational.com (see Products & Samples/Governments & Industries) or call + 1 (203) 426-0800.

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com

Technical Data

Design Features. The contractor claims the Leclerc is the first example of the next generation of main battle tanks. The Leclerc features an automatic loader for the main armament, advanced-design diesel engine options, and advanced integrated electronic systems.

Crew. Three: commander, gunner, and driver.

Dimensions. The contractor provided the following data, which reflect the serial-production Leclerc Mark 2 tank. Our research indicates that the combat weight is actually 55.6 tonnes (61.29 tons) and the width is 3.71 meters (12.17 ft).

	<u>SI Units</u>	<u>U.S. Units</u>
Length	9.87 m	32.38 ft
Width	3.30 m	10.83 ft
Height	2.46 m	8.07 ft
Combat weight	54 tonnes	59.52 tons
Fuel capacity	1,300 liters	345.74 gal

Performance. The maximum speed and range data reflect use on a paved road. External fuel tanks can extend the maximum range to 700 kilometers (435 stat mi).

	<u>SI Units</u>	<u>U.S. Units</u>
Maximum speed	71 kmph	44.09 mph
Maximum range	550 km	341.55 stat mi
Step	95 cm	3.11 ft
Trench	2.9 m	9.51 ft
Slope	30%	30%
Gradient	60%	60%
Fording (with kit)	4.0 m	13.12 ft

Engine. Wartsila SACM Diesel V8X-1500 T9 engine. This advanced-design V-8 engine generates 1,100 kilowatts (1,474.5 hp), with a power-to-weight ratio of 23.37 kilowatts per tonne (24.77 hp/ton).

The Turbomeca TM307 gas turbine can operate independently; when the main engine is shut down, the turbine unit powers a 9-kilowatt (12.06-hp) generator. The Chausson engine cooling system features two

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horizontal radiators. The Sagem (now a component of Safran) electronic engine management system uses a computer to determine and control the starting procedure and fuel requirements; it also monitors the condition of the engine.

Leclerc UAE Powerplant

The United Arab Emirates tanks mount the Euro-PowerPack, a Motoren- und Turbinen-Union MT 883 diesel V-12 engine. This advanced-design, liquid-cooled powerplant generates 1,119 kilowatts (1,500 hp), with a power-to-weight ratio of 20.72 kilowatts per tonne (25.2 hp/ton) in the Leclerc application. This Leclerc variant also mounts a new engine cooling and air-filtration system.

Gearbox. Soci t  d'Equipements Syst mes et M canismes (SESM) ESM 500 electronically controlled automatic gearbox, with five forward and two reverse gear ratios. This gearbox incorporates a shifting-under-torque design. A hydraulic clutch and a hydrokinetic retarder for the hydraulic steering system are standard.

Leclerc UAE Gearbox

The United Arab Emirates Leclerc with the MTU EuroPowerPack mounts the Renk HSWL 295 TM electronically controlled automatic gearbox, with five forward and three reverse gear ratios. The integrated assembly consists of a transfer gearbox, an integral braking system, two power takeoffs (one for the air conditioning), an integrated lubrication and cooling system, a hydrodynamic torque converter, and an infinitely variable steering system.

Suspension and Running Gear. Advanced-design twin-cylinder hydro-pneumatic suspension, with six double-tired road wheels and five track return rollers on each side. The system reportedly provides an exceptionally stable firing platform under all conditions. A driver-operated track tension device is standard, allowing on-the-move adjustment.

Armament

Main Armament. Giat/Nexter CN-120-26 Lisse (F1) 120mm smoothbore gun. This gun features a magnesium alloy thermal sleeve and an automatic loading mechanism. Elevation (+20 ), depression (-8 ), and turret traverse (360 ) are electrically powered. The Leclerc carries 22 main gun rounds in the loading unit, with an additional 18 rounds available in the right front of the hull. Rheinmetall DeTec (now Rheinmetall Defence) assisted in the development of this 52-caliber gun and its ammunition.

The prime contractor also installed a prototype 140mm tank cannon for demonstrations in the United Arab Emirates, the first export customer of the Leclerc.

Secondary Armament. One 12.7x99mm (.50 cal) coaxially mounted machine gun; one pintle-mounted 7.62x51mm NATO (.308 Winchester) machine gun on the turret roof. The commander or gunner can aim and fire this machine gun from inside the turret. The Galix electrically operated grenade launcher system, consisting of nine launchers on each side of the turret, can dispense regular smoke or IR smoke grenades, window (chaff) decoys, and anti-personnel grenades.

Fire Control. The sights and CN-120 cannon on the AMX Leclerc are fully stabilized. The AMX Leclerc also maintains the French practice of a stabilized gun and a slaved sight, enabling the tank to continue delivering accurate fire if the stabilization system fails.

Digital Fire Control Suite

The Leclerc digital fire control system features duplicate central processors for turret control and ballistics computation. The ballistic computer takes inputs from a variety of sensors, including the sights and the Hardy 20 muzzle reference system. A similar computer handles the ordnance control functions; both computers have a 500-megabyte ROM and 500-megabyte RAM capacity. The fire control system uses two laser rangefinders, with readouts for both the commander and gunner.

HL60 Gunner's Sight

The SAGEM HL60 gunner's sight is a modular, fully stabilized digital, multichannel unit. The HL60 mounts on the mantlet and links mechanically to the main armament. The stabilized sight head features a beryllium-based alloy mirror with two gyroscopes and three accelerometers for stabilization; it also provides vertical reference and other attitude data.

The HL60 acquisition component consists of an infrared imagery unit, a laser rangefinder, a charge coupled device, an electro-optic imagery device, an optical link, and a display unit. The acquisition component has a two-magnification (2x and 10x) day channel, a 10x electro-optic channel, and a thermal channel with a maximum detection capability of 5,000 meters (5,468 yd). The electronics unit of the HL60 connects to the tank's databus; this unit calculates the speed and angular position of the target for the fire control computer.

HL70 Commander's Sight

The commander's station features a Sagem HL70 360-degree traverse gyroscope-stabilized panoramic day/passive night sight with an integral laser rangefinder. The tank commander's station also provides four fire control operating panels (master and monitoring control, main armament and automatic data transmis-

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sion control, secondary armament control, and sensor input control) and an electro-optic display unit that presents the view of the gunner's sight.

The prime contractor and Aerospatiale Matra developed the new FINDERS (Fast Information, Navigation, Decision and Reporting System) command, control, and communications (C³) system specifically for the Leclerc. This equipment, featuring a digital colorized map display and position/navigation system, integrates with the tank's fire control and communications system.

The United Arab Emirates was the first to employ FINDERS in their Leclerc tanks. In 1996, Giat Industries began offering FINDERS for export and installation on other tanks and combat vehicles. France, however, did not procure FINDERS for its Leclerc tanks. Instead, the French Army selected a version of the Thales (formerly Thomson-CSF) Système d'Information Terminal (SIT V1), the Icone. System integration occurred as a production cut-in for the Block II+ tank.

Variants/Upgrades

Variants. The prime contractor has thus far developed the following Leclerc variants:

<u>Designation</u>	<u>Description</u>
Tropicalized Leclerc	Variant specifically for the United Arab Emirates, which partially funded its development. Automotive components include the EuroPowerPack and Renk gearbox, as well as an enhanced cooling system and a multistage air-filtration system. The tank also features an extended hull for greater fuel capacity, crew compartment air conditioning, and the FINDERS system. The UAE ordered 388 Tropicalized Leclerc tanks; production was complete in 2002.
Leclerc DNG	Depannage Nouvelle Generation, an armored recovery vehicle (ARV). Based on the lengthened Leclerc chassis, the DNG features a stabilizing blade, a dozer blade, a 30-tonne (36.45-ton) hydraulic crane, a 35-tonne (38.58-ton) single line pull main winch, an auxiliary winch, and related recovery equipment and tools. The French Army ordered 15 Leclerc DNG; the UAE ordered 46 Leclerc DNG along with its initial Leclerc main battle tank order.
Leclerc EPG	Engin Principal de Génie, a main engineer vehicle. The EPG shares about 70 percent of its components with the DNG; it mounts an articulated telescoping arm on the right front of the chassis that can accept an excavating bucket, shovel, auger, or pneumatic hammer. A platform over the engine compartment accommodates various engineer equipment. The French Army currently has no requirement for the Leclerc EPG, as it had just accepted the last of 71 Engin Blindé de Génie armored engineer vehicles immediately prior to the introduction of the Leclerc EPG.

Note: *The Leclerc DNG and Leclerc EPG can both mount the prime contractor's K2D mine clearance kit. This equipment consists of the Full-Width Mine Plough, the Pearson Pathfinder dual minefield marking system, and the Giat DEMETER electromagnetic signature duplicator. The DNG can also mount the Pronit rocket-propelled mine clearing system in conjunction with the K2D kit.*

Modernization and Retrofit Overview. Despite the relative youth of the Leclerc (which entered serial production in 1990), the French Army is already exploring a number of modernization and retrofit programs.

In **Technical Data**, we noted the test installation of a 140mm tank cannon; this new armament will likely become part of a Leclerc retrofit program. To that end, the prime contractor has designed a new turret for the Leclerc specifically to accept the 140mm tank cannon. The new turret-gun component, along with a new armor suite, an automatic target tracking capability, and a fully integrated command and control system, should be ready after 2010.

As we noted in **Technical Data**, the prime contractor integrated the Thales Icone battlefield management system with the Leclerc as a production cut-in (the Block II+ tank); Icone will likely also become a retrofit component of earlier production tanks as well. Other systems likely to become retrofit packages and potential production cut-ins include:

- The Thales Dispositif d'Identification du Combat (a combat identification system)
- The Iris second-generation thermal imaging system

The French are also exploring long-term Leclerc enhancements through the Leclerc 2015 program, which

concentrates on integrating the Leclerc into France's version of network-centric warfare, the Bulle Opérationnelle Aéroterrestre system. The technologies include additional appliqué armor with integral sig-

nature reduction technology, active defense systems, millimeter-wave decoys, grenades for the Galix launcher, and a laser jamming weapon.

Program Review

Background. In December 1982, the French Ministry of Defense proceeded unilaterally to develop a new tank to replace the increasingly obsolescent AMX 30 after the on-again, off-again negotiations to develop a common French-German tank finally fell through. Initially, the French named the new tank the AMX 48 Engin Principal de Combat (EPC); the French Army later adopted the designation AMX Leclerc, honoring French General Jacques Leclerc of World War II fame.

Corporate Restructuring

In October 2006, Giat Industries approved a reorganization and an associated name change to Nexter. Under the restructuring, the group organized under four core operations:

- Nexter Systems
- Nexter Munitions
- Nexter Electronics
- Nexter Mechanics

The contractor reportedly undertook this move to better prepare itself for consolidation in the 5near future, possibly with either Thales or EADS.

Description. The AMX Leclerc is arguably one of the world's most technologically advanced tanks. As French Army specifications required the Leclerc not to exceed the dimensions of the AMX 30, the Leclerc is notable for its compactness and light weight compared with other modern main battle tanks.

Conventional Layout

The basic internal layout is conventional. The driver sits at the left front of the hull; the commander sits on the right of the turret, with the gunner to the left. Both the commander and gunner can fire the main armament; the commander has overriding control.

A databus links the electronic components together, reducing the wiring requirement and simplifying maintenance. The electronics system represents more than half the total unit price of the AMX Leclerc.

Modular Armor Suite

The designers of the AMX Leclerc met the design weight specifications by reducing the weight of the components and the internal volume of the vehicle. The hull features a self-supporting frame, mounting the armor plates. This modular armor design saves weight and allows for relatively easy armor upgrades.

The Leclerc features a combined collective and filter-type nuclear, biological, and chemical (NBC) protective suite, as well as a fire detection/suppression system. A vehicle navigation system is integral with the gunner's equipment. The Leclerc also features a redundant vehicle intercom system; the external communications suite is based on the Thales (formerly Thomson-CSF)/Telecommunications Radioelectriques et Telephoniques PR4G frequency-hopping radio.

Problematic Production Program

The Leclerc production program proceeded slowly, with its fair share of developmental problems. At one point, in January 1995, Leclerc production for the United Arab Emirates was 217 days behind schedule. However, by late 1996 the prime contractor had the Leclerc production program back on schedule. In early 1997, the French Ministry of Defense announced a multiyear procurement contract covering 184 Leclerc tanks. The prime contractor's offering of a 10 percent reduction in unit price proved the key to moving the plan forward.

Block Series Production

The French Army procured the AMX Leclerc in the Block I and Block II configurations; the Block II remains the production-standard model. The first 134 tanks of Block I lack the air conditioning featured on the Tropicalized Leclerc. After tank number 134, the Block II tanks feature the air-conditioning package. The Block II+ tank, which entered production in 2003, incorporates an improved armor suite, the Iris second-generation thermal imaging system, the Icone battle management system, and the Thales battlefield identification system.

If serial production of the Leclerc resumes, the prime contractor intends to integrate further improvements through future Block designations.

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Significant News

France Adopts 2008 Defense Budget – The French National Assembly approved the “Defense Mission” allocation within the overall 2008 national budget on November 14, 2007, providing EUR36.78 billion to the Defense Ministry. The total defense budget, which will include non-defense mission allocations, is expected to reach EUR48.07 billion in FY08. This would mark a slight increase of 0.77 percent from the EUR47.7 billion provided in the defense budget during FY07, although if inflation is factored in it amounts to roughly EUR250 million less according to opposition Socialist deputy Patricia Adam.

The 2008 defense budget is the last from the Military Planning Law 2003-2008, laid out under the previous government of former President Jacques Chirac. Chirac was known to favor the military, viewing it as an emblem of French national greatness and prestige, and protected defense from budget cuts. But with a new government arriving in May 2007 under President Nicolas Sarkozy, it is expected that leaner times will befall the French military. Sarkozy has made no secret of his belief that wasteful spending pervades the Defense Ministry. While Sarkozy stressed maintaining defense spending at a minimum of 2 percent of GDP during the electoral campaign, since coming into office this promise has been noticeably absent in his speeches.

The 2008 defense budget ensures all programs are funded, but real changes are anticipated for the 2009 budget when a new Military Planning Law crafted from the new defense and security White Paper (due in March 2008) begins. Defense Minister Hervé Morin has already begun cautioning defense industry officials that the current level of defense funding will be difficult to maintain and that major cuts are possible. He noted that in order to simply meet existing equipment commitments between FY09 and FY11, procurement spending will need to rise 43 percent (EUR4 billion), an unrealistic option considering the French economy. (*Agence France Presse*, 11/07)

France Setting Up Special Rapid Reaction Arms Sales Task Force – France is setting up a special task force focused on reacting rapidly to shifts in individual arms sales environments. The new unit will operate from a metaphorical “war room” comprising the president, the prime minister and the ministers of defense, finance and foreign affairs, together with the commander in chief and a senior Élysée official. The task force, which will operate on a case-by-case basis, emerged in response to the recent failed French effort to sell its Rafale jet fighter to Morocco. The personal intervention of French President Nicolas Sarkozy on behalf of the Rafale sales pitch in Morocco was ultimately insufficient, as Rabat elected to go with a cheaper U.S. bid of F-16 fighters. The Rafale, built by French aviation company Dassault, has yet to acquire a foreign buyer after 13 years of being pitched across the global export market.

President Sarkozy has set up the task force to better copy the U.S. arms export model which emphasizes rapidly assembling arms deals specifically designed for a unique situation, as well as using arms exports as a means to penetrate markets. (*Agence France Presse*, 10/07)

UAE Sending Troops to Afghanistan? – A report in the *Toronto Star* on July 20, 2007, claimed that the United Arab Emirates has considered sending a small detachment of troops to operate alongside Canadian forces in southern Afghanistan. This move, strongly encouraged by Canadian diplomats and military officials, is aimed at countering the impression that the NATO-led International Security Assistance Force (ISAF), made up of 37 countries, is a Western attempt to usurp Islamic beliefs and otherwise colonize Afghanistan.

If the UAE indeed goes along with its plans to contribute a small, tactical unit, it would be a victory for Canadian Prime Minister Stephen Harper. Harper, while pressing NATO allies to increase their contributions to Afghanistan, has been on the defensive about whether to continue with Canada’s mission in the country. The UAE, which maintains strong relations with both the U.S. and the United Kingdom, would likely send a unit including four Leclerc main battle tanks, two platoons of armored vehicles, two self-propelled 155mm guns, and a detachment of unmanned aerial vehicles. The UAE might also provide much needed financial support for developmental projects in the impoverished southern regions of the country. (*Toronto Star*, 7/07)

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Funding

The French Ministry of Defense, through the French Army, funded the development and French Army procurement of the AMX Leclerc main battle tank.

The United Arab Emirates (UAE) funded integration of the EuroPowerPack MT 883 diesel engine and the Renk HSWL 295 TM automatic gearbox into the Tropicalized Leclerc.

Contracts/Orders & Options

In March 2006, the French Army Central Materiel Directorate (DCMAT) awarded Wartsila Sacm Diesel – now Wartsila France SAS (Mulhouse, France) – a contract worth \$94.8 million to provide 10 years of Maintenance in Operational Condition (MCO) for the V8X-1500 T9 diesel engines of the French Army Leclerc fleet.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Dec	1982	French Army initiates Engin Principal de Combat program
Jun	1990	France officially unveils Leclerc at Eurosatory weapons fair
Dec	1991	First production tank rolled out
Feb	1993	First export sale to United Arab Emirates
Mid	1995	Giat demonstrates export version of Leclerc in Saudi Arabia
Summer	1996	Further demonstrations in Saudi Arabia
	2004	Deliveries to the UAE complete
	2006	Serial production run for French Army complete; development and marketing continue
	2008	Leclerc serial production line remains dormant

Worldwide Distribution/Inventories

Export Potential. The steep unit price of the Leclerc tank continues to hinder its marketability. In February 1993, the United Arab Emirates became the Leclerc's first (and thus far, only) export customer, procuring 388 tanks plus two driver training tanks and 46 armored recovery vehicles (Leclerc DNG).

Countries. **France** (406, plus 11 prototype/developmental and contractor demonstration tanks), **United Arab Emirates** (388).

Forecast Rationale

In 2006, the prime contractor reportedly completed deliveries of the AMX Leclerc main battle tank under the French Army procurement contract. The French Army Leclerc inventory consists of 406 operational Leclerc MBTs, as well as nine prototypes and two Tropicalized Leclerc demonstration tanks.

Limited Export Success

In 2004, the United Arab Emirates took delivery of the last of the 388 Tropicalized Leclerc main battle tanks from the original 1993 order. In addition, the UAE operates two Leclerc driver training tanks and 46 Leclerc DNG armored recovery vehicles.

Nexter Systems continues its aggressive promotion of the Leclerc on the international market. However, the Leclerc has yet to score any export sales beyond the UAE.

End of the Line?

Our 10-year production outlook reflects the lack of any new orders following the final deliveries of the AMX Leclerc main battle tank under the French Army procurement contract last year. Without future French Army procurement or export sales, this could well have been the end of the Leclerc production line.

Beyond new production, however, the French Army and Nexter Systems are cooperating on a number of Leclerc

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modernization and retrofit programs. These upgrade programs, while not involving new tank production per se, will keep the Leclerc line active throughout the forecast period.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

Vehicle	(Engine)	thru 07	High Confidence Level				Good Confidence Level				Speculative		Total 08-17	
			08	09	10	11	12	13	14	15	16	17		
NEXTER														
AMX LECLERC ^(a)	V8X-1500	417	0	0	0	0	0	0	0	0	0	0	0	0
LECLERC UAE ^(b)	MB 883 KA 500	388	0	0	0	0	0	0	0	0	0	0	0	0
Total Production		805	0	0	0	0	0	0	0	0	0	0	0	0

(a) Production for French Army procurement only.

(b) Production for export to the United Arab Emirates only; does not include two driver training tanks and 46 Leclerc armored recovery vehicles (Leclerc DNG).



French Army AMX Leclerc Main Battle Tank

Source: French Ministry of Defense