Every™ Mission

Engines for Defence 128-800 hp

Cummins Inc. is the world's **largest** independent diesel engine manufacturer and is a **major supplier to defence agencies around the world** including the UK Ministry of Defence (MoD) and US government. Large numbers of Cummins-powered units are currently in **active service**, in a wide variety of equipment ranging from logistic trucks to heavy artillery.

Over $400 million is invested annually in research and engineering to maintain our technology leadership across a power band extending all the way to 3,500 hp (2611 kW). With engine manufacturing in 8 countries and over 5,000 support locations worldwide, Cummins has evolved into a truly international company.

That's why Cummins is specified in so many military applications around the world. The B/ISBe series engines alone are in service in over 30,000 items of military equipment worldwide.

Experience with expertise

The Right Power For Every Need

Cummins is a global manufacturer of engines and related technologies including engine components, fuel systems, air handling, filtration, emission solutions and electrical power generation systems. Plus, Cummins is a leading producer of natural gas engines for alternative fuel vehicles.

Cummins diesels supply power for every type of military application worldwide: wheeled and

SeaArk 34 Ram Patrol Vessel powered by QSB5.9

tracked combat vehicles, logistic vehicles, naval propulsion and auxiliaries plus multi-megawatt generator sets. Cummins delivers every engine you need, wherever you need it.

Global Emissions Standards

Cummins is focused on providing the highest engine availability at the lowest possible running costs, whilst meeting the latest emissions regulations. Our strategy is driven by evaluating customer needs and market conditions in order to provide the optimum products with the appropriate technologies wherever Cummins engines operate. Equipped with a full portfolio of technology options such as SCR (Selective Catalytic Reduction), EGR (Exhaust Gas Recirculation) and DPF (Diesel Particulate Filter), Cummins can provide every technology to meet global engine emissions requirements. SCR aftertreatment has been chosen to meet the Euro 4 and Euro 5 on-highway emission standards.

For the U.S military market, Cummins engines comply with the latest EPA emissions regulations using Cooled Exhaust Gas Recirculation (CEGR) and can be used for applications where military fuels are not required.

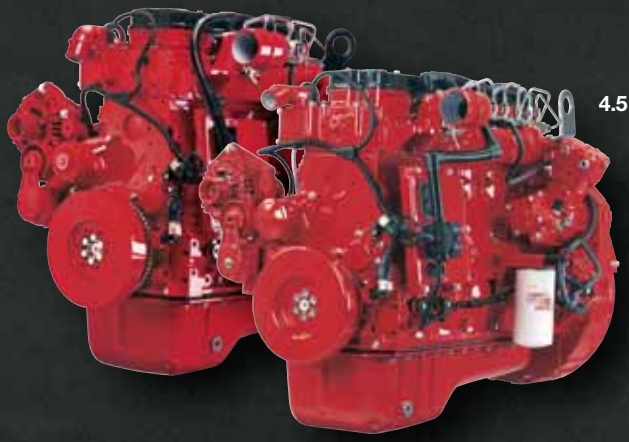
Also, engines remain available which meet previous emissions standards. Speak to your local Cummins representative to understand the emissions applicable to you. Wherever you are, Cummins has a Euro/EPA certified engine to meet your needs.

Military Fuel Capability*

Cummins engines are capable of operation on a wide range of military fuels, including NATO F-34 & F-54, JET A-1, JP-8 and AVTUR. If high-sulphur fuels are to be used, engines can be offered either with or without the aftertreatment system, depending on customer preference. That's why you can rely on Cummins – every time.

*** In battlefield situations the engine can run on military fuels without system derate, utilising emergency vehicle ratings.**

Czech Army Pandur II 8x8 AFV powered by the ISLe T450 hp (Steyr-Daimler-Puch)



4.5 & 6.7 litre ISBe

Peacekeeping, **intervention** and **expeditionary operations** are driving the demand for lighter, more mobile AFVs suitable for **rapid deployment** and **all-terrain capability**. Despite sophisticated **protection** and enhanced **firepower**, out in the field this new generation of AFVs will need to rely on **speed** and **concealment** to ensure **survivability** – utilising the **latest clean combustion technology** offered by the Cummins engine range.

Rapid deployment power

RG-31 mine protector vehicle powered by QSB6.7 275 hp (Land systems OMC)

8.9 litre ISLe

These highly advanced engines provide outstanding power density for higher speeds as well as with exceptional fuel-efficiency and sustained operations. To meet Euro 4 and Euro 5 emissions with clean combustion techniques Cummins engines reduce both thermal and visible smoke signature to very low levels, helping to prevent detection. The engine quality well recognised by leading manufacturers of both wheeled and tracked Armoured Fighting Vehicles (AFVs), as well as close relatives such as Armoured Personnel Carriers (APCs) and reconnaissance vehicles.

Cummins QSB/ISBe and QSL/ISLe engines provide ideal configurations for many of these vehicle types – building on the rugged dependability of the B and C Series engines proven with defence forces around the world. With high power output and compact envelopes they provide significant installation advantages by releasing valuable internal space and aiding payload. Deep reserves of torque are available right across the rpm range for rapid response and cross-country capability.

The QSM and QSX engines are power matched for heavier AFVs. Although exceptionally strong, they are lighter and more compact than other engines in their class. With integrated engine compression brakes they provide a stealth capability by preventing the give-away thermal signature associated with service brakes.

To help unleash the full driving potential of the vehicle, Cummins electronic technology reaches out from beyond the engine to fully integrate with other electronically controlled systems on the powertrain.

While a new generation of AFVs may offer improved operational capabilities, military forces are also looking at cost-effective methods of upgrading existing vehicles. Cummins repower capability has dramatically extended the life of armoured equipment in many projects – while enhancing performance, reducing fuel consumption and lowering maintenance costs.

Clockwise from top: British Army FV430 MK3 powered by 6BTAA 250 hp (BAE Systems), ARMA 8x8 armoured vehicle powered by ISLe T450 hp (Otokar), Portuguese Army Pandur II 8x8 AFV available with ISLe T450 hp (Steyr-Daimler-Puch), the RG-35 is a multi-purpose mine protected armoured vehicle, powered by an ISL 450 hp (developed as a private venture by BAE Systems in South Africa), British Army Bulldog upgraded armoured fighting vehicle powered by 6BTAA 250 hp (BAE systems), Danish Army Eagle IV Armoured Patrol Vehicle with ISBe 250 hp (Mowag)

Supacat 600 series
powered by ISBe 185 hp

Logistic support **power**

Close support logistic vehicles perform an **essential link** for military operations, moving vital supplies, fuel and personnel to the **front line**.

Recognising the need to improve the mobility and reduce the vulnerability of these vehicles, latest designs feature improved protection and sophisticated drivelines. With higher on and off-road performance these vehicles can maintain progress with a rapidly moving battlefield, reducing the logistical tail.

For cargo carriers, tactical vehicles, bowsers and transporters, Cummins engines need very little introduction. Across the 4.5 to 15 litre range they are equipped with deep reserves of torque to outperform much larger engines, particularly when hill-climbing. Advanced electronics and turbocharging contribute to class-leading levels of fuel efficiency.

Cummins ISB^{e} has established an outstanding reputation for power, performance and driveability appropriate for the latest generation of all-terrain, multi-purpose vehicles.

The low relative weight of the ISB^{e} enhances payload potential. With stealth factors becoming increasingly important, engine noise is reduced due to an innovative rear gear train design and common rail fuel system. Clean combustion techniques lower both thermal and visible smoke signature, adding a further advantage.

Indeed, the ISB^{e} engine comes with a military pedigree that few other engines can match, based on the outstanding success of its B Series predecessor in the British and U.S. Armies. Now joined by the larger ISL^{e}, these engines offer unrivalled power and productivity for medium mobility transport and tactical vehicles.

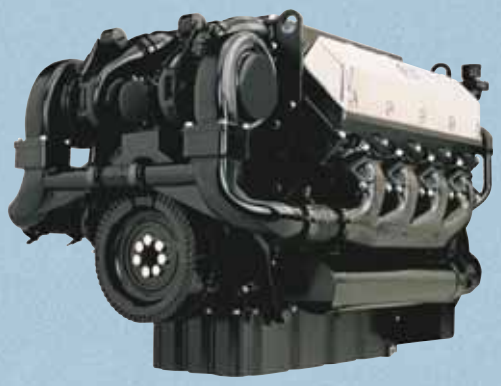
Playing a key role in the logistical chain are fleets of commercially proven road haulage trucks and tankers delivering supplies to the forward

Clockwise from top left: UK Royal Air Force 6 x 4 aircraft refueller designed for air transportability, powered by a 245 hp C Series (Dennis Eagle), Duro III military tactical vehicle 6x6 powered by ISBe 185 hp (Mowag), High mobility 6 x 6 tactical truck powered by an ISM 400 hp (ATC/TATRA)

receiving area ready for onward transfer. Specified to military standards, these vehicles require engines with first class reliability, fuel-efficiency and the ability to cope with low standard roads. Cummins heavy-duty engine range is ideally suited for this vital support role.

The 11 litre QSM comes with a life-to-overhaul goal of 1 million km. Built with structural strength for long durability, it weighs only 940kg to offer a useful payload advantage. The QSM is also equipped with the latest advanced combustion technology for improved fuel economy and emissions control with longer oil change intervals.

For ultra-heavy duty haulage look no further than the 15 litre QSX. A revolutionary design with dual overhead camshafts, available with an integrated engine brake delivering up to 665 hp (496 kW) of braking power. EPA Tier 3 / EU Stage IIIA QSX offers higher than ever reliability and a life-to-overhaul goal of 1.6 million km.



M2/M3 Bradley family, powered by the 600 hp V903 (BAE Systems)

Self-propelled heavy artillery vehicles such as the MLRS and the AS90 SPH have given field commanders dramatically **enhanced firepower**, with the ability to operate at **long range** with **exceptional accuracy**.

Heavy-duty combat power

Left: US Marine Corps AAV7A1 Amphibious Assault Vehicle powered by the V903 (BAE Systems) Right: British Army, 155mm AS90 self-propelled howitzer, equipped with VTA903 T660 hp (BAE Systems)

The Bradley fighting vehicle was first put into production in 1981 powered by the Cummins VTA903 at 500 bhp. This was then upgraded in 1989 to 600 bhp.

The VTA903 engine started a new upgrade program in 2007 for integration into the M109A6 PIM which also included electronic fuel system controls and diagnostics

A key design consideration is the ability to operate with rapid, easy movement across almost any terrain, displaying much of the mobility of a main battle tank.

While the engine needs to be powerful and compact to meet this requirement, it also needs to offer exceptional reliability to ensure maximum availability of these high-value battlefield assets. The heavy-duty V903 engine is purpose developed by Cummins for these highly demanding applications – and during combat situations the outstanding abilities of this unique engine have been fully proven.

The V903 has also proved an ideal power solution for one of the most important elements on the battlefield – the tracked infantry fighting vehicle, typified by the M2 Bradley together with derivatives such as the M3 cavalry fighting vehicle.

Equipped with 600 hp (447 kW) of Cummins heavy-duty power, the Bradley can maintain progress with main battle tanks right at the forefront of the action. Very high power-to-weight ratio enables these vehicles to incorporate heavier armour and more firepower, while the inherent reliability of the engine is a major advantage during high intensity operations.

Distinguished Service at Every Milestone

- In 1981 Bradley Fighting Vehicle production began with the VTA903-500
- The United States Marine Corps AAVP7A1 upgrade began in 1982 with the VTA903-400
- In 1988 the V903-295 was introduced with the M9 Armoured Combat Earthmover (ACE)
- The Bradley Fighting Vehicle upgrade program began in 1989 with the VTA903-600
- United Kingdom Ministry of Defence started AS-90 production with the Cummins VTA903-660 in 1991
- In 1998 the United States Marine Corp initiated upgrade of AAVP7A1 fleet with the V903-525

RTCH Rough Terrain Container Handler adapted for the US Army, powered by a 375 hp QSM11 (Kalmar Industries)

11 litre QSM & 15 litre QSX

Special purpose equipment

Military engineering equipment with the ability to perform **rapid road clearing**, **logistics handling** or **airfield rebuilding** exert an important influence on the speed and success of the overall operation. Peacekeeping operations now place **higher than ever demands** on equipment and are fully dependent on the ability of the engine to operate at **peak performance for long periods**.

Clockwise from top left: Finnish Air Force ground power unit with integrated 152 hp B Series (Houchin), French MPI Beach Recovery Vehicle powered by the ISMe, 420 hp (MPI), HMT 4x4 400 Series air-portable Special Forces vehicle powered by the ISBe 185 hp (Supacat)

In this respect, Cummins engines are highly regarded by leading equipment manufacturers – offering higher power density with unrivalled levels of durability. For engineering, handling and airfield support equipment, a full range of engines are available that meet global low emission standards for off-highway applications.

The latest Cummins Quantum System (QS) electronic engines can operate at full power at lower rpm. Cummins can also offer in-depth experience in repowering older equipment to significantly extend working life on a cost-effective basis.

Cummins power is well represented in a new generation of highly specialised equipment such as the High Mobility Engineering Vehicle (HMEV), with road speeds of 100 km/h combined with generous hydraulic and earthmoving capabilities. While the Cummins powered RTCH rough terrain reachstacker meets the most demanding requirements for all-terrain container handling.

The Advanced Medium Mobile Power Sources (AMMPS) is the future of power in the field. For on-site power the multi-fuel rugged generator operates in all environmental extremes. Highly reliable it provides excellent power quality and battlefield mobility.

The Advanced Medium Mobile Power Sources (AMMPS) for on-site power generation

BvS10 armoured all-terrain vehicle powered by the ISBe 281 hp (Hägglunds)

Enhancing your vehicle

Cummins information products provide **easy access to the engine management system for rapid diagnostics** and data downloading, helping to ensure **maximum uptime for vehicles**.

Cummins Electronic Technology

Cummins information products provide easy access to the engine management system for rapid diagnostics and data downloading, helping to ensure maximum uptime for vehicles.

Cummins Electronic Technology allows the engine to look after itself. Sensors throughout the engine continually send data back to the ECM for self diagnosis and protection.

Concealment technology

Cummins latest clean combustion technology significantly enhances the stealth capability of military vehicles. Lower engine noise reduces the acoustic signature and visible smoke emissions are virtually eliminated.

A major reduction of particulate and other invisible emissions from the vehicle exhaust also reduces thermal imaging signature. Stress-free engine brake options prevent the give-away thermal signature typically emitted by wheeled vehicle braking systems, as well as significantly extending service brake life.

Electronic Tools

INSITE™ – For years Cummins INSITE software has been making it easy for technicians to troubleshoot, repair and service our electronic engines through easy-to-follow steps on your computer. This provides the kind of uptime you demand from your vehicles.

QuickCheck 5200

With the QuickCheck 5200 handheld computer you get everything you need to capture and monitor engine data quickly and conveniently. The rugged, portable and user-friendly QuickCheck 5200 is fully compatible with Cummins electronic diesel engines as well as other electronic engines.

QuickCheck 5200

For more information, please visit us at http://quickcheck.cummins.com or see Bulletin 4081813.

128-800 hp Power Range

Cummins range of electronic engines has evolved using well proven technology and meets military requirements for durability without the need for re-engineering.

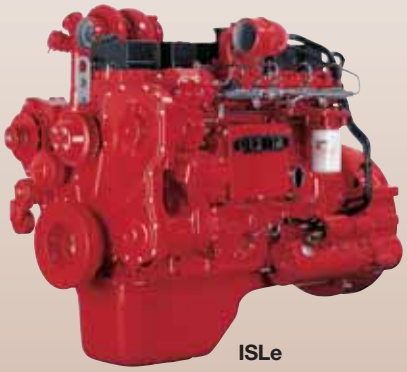
In-service reliability is further assured thanks to smart self-protection systems preventing engine wear from cold starting, overheating or excessive idling. Extended service intervals and reduced maintenance also ensure higher than ever levels of vehicle availability.

Duro IIIP powered by ISBe 5.9 245 hp (Mowag)

ISF

ISBe 4-cylinder

ISBe 6-cylinder



ISLe

Power for military equipment

The **outstanding reliability** of Cummins electronic technology has been well established for over 10 years in the most **demanding applications** operating under **severe duty cycles**.

Cummins Power for Military Equipment

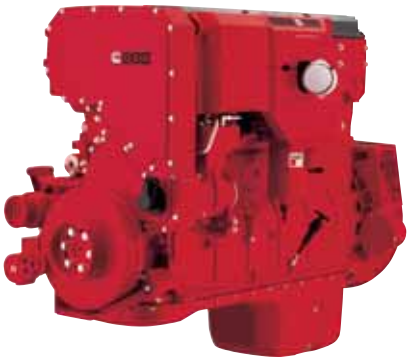
V903 (295-800 hp)

Commercial product adapted for military use, the V903 engine is a diesel engine with proven military credentials. A 14.8 litre (903 C.I.D.) 90 degree vee 8 cylinder format provides high power density, enhanced by 32 valves and compact air to water after cooling. The highest rated versions feature electronic controls with a hybrid fuel system and turbo charging options to tailor the product to any needs. Lower ratings currently retain the proven PT fuel system with fixed geometry turbo charging or natural aspiration.

Pandur II 6x6 AFV available with ISLe 450 hp (Steyr)

Max. power: 800 hp @ 2800 rpm (597 kW)
Peak torque: 2362 Nm @ 2200 rpm
Weight (dry): 1,271kg

ISMe / QSM



QSX

V903

Model	Cylinders	Capacity (litres)	Max Power		Max Torque (Nm)
			kW	hp	
ISF 2.8	4	2.8	110	147	360
ISF 3.8	4	3.8	125	167	600
ISBe	4	4.5	136	182	650
ISBe	6	6.7	210	281	970
ISLe	6	8.9	336	450	1700
ISMe	6	10.8	306	410	2010
QSM	6	10.8	298	400	1898
QSX	6	15	496	665	2542
V903	Vee 8	14.8	597	800	2362

Cummins is a pioneer in product development, thus specifications may change without notice. The ratings above are for Euro 3 and EPA Tier 3 / EU Stage IIIA emissions. Other power and torque ratings are available with Euro 4 and Euro 5 emissions standards.

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Bulletin 4087195 Printed 08/11
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