



**A LEAP FORWARD
IN OUTBOARD ENGINEERING:
NEANDER TURBO DIESEL**

NEANDER Dtorque.

THE FIRST TURBO DIESEL OUTBOARD WITH DUAL CRANKSHAFT.

The NEANDER Dtorque Turbo Diesel sets a new benchmark in diesel engineering, especially for outboard motors. Its 800cm³ twin-cylinder aluminium powerhead delivers a lusty 50hp at the propeller shaft. But what's more remarkable is its torque output. Peaking at 111Nm at 2,500rpm, that's more than the best-performing 70hp 4-valve technology electronic fuel injected four-stroke gasoline outboards on the market today.

This gives the Dtorque exceptional lugging ability as well as the ability to get onto the plane quickly, and both with modest fuel consumption. Here, it scores outstandingly. Expect little more than 10 to 12 litres per hour at full throttle,

the kind of figure that a 70hp gasoline outboard would be returning at 2,000rpm before its steep climb towards 30 to 40 litres per hour flat-out at full load.

(Source: magazine "boote")

All this, as well as emissions well within the latest EU limits, is with state-of-the-art common rail fuel injection (BOSCH), but NEANDER's unique innovation is its dual counter-rotating crankshaft design. By generating opposite forces, the two shafts cancel out most of the vibrations and moments around the steering axis that would otherwise make such a small and powerful twin-cylinder diesel outboard hard to handle.



Counter-rotating crankshafts in the powerhead reduce noise and vibration to a minimum.



Low fuel consumption means less queuing for fuel.



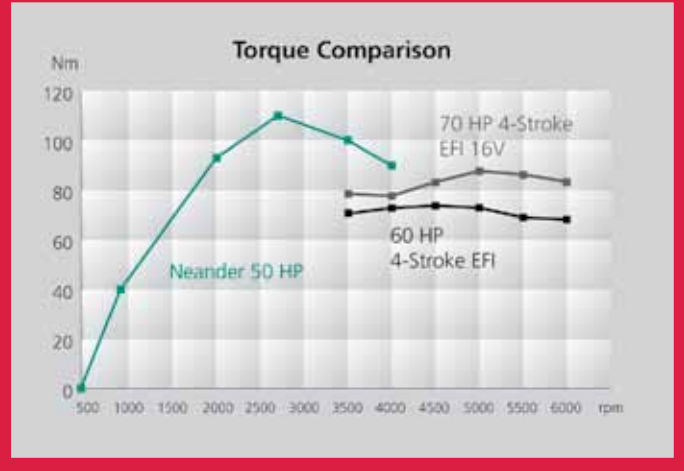
Workboat operators will welcome the lower operating costs, range, and dependability of diesel.

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AT WORK, DIESEL DOES BETTER ON LOW-END TORQUE PERFORMANCE, FUEL ECONOMY AND RANGE.





Gasoline outboards are for leisure use mainly. When you've got a serious job of work to do and need to put in a full shift day after day you need the hard-working dependability of a diesel engine.

Now operators of small workboats have that option in outboard form with the NEANDER Dtorque.

This compact unit is the only outboard in the mid-power range to offer all the advantages of state-of-the-art diesel engineering. The NEANDER Dtorque develops a creditable 50hp when you need a turn of speed, but it's the torque figure that matters most in the working environment. The delivery of a mighty 111Nm at 2,000-3,000rpm will get you quickly up onto the plane and also provide all the muscle you need when the boat is fully laden.

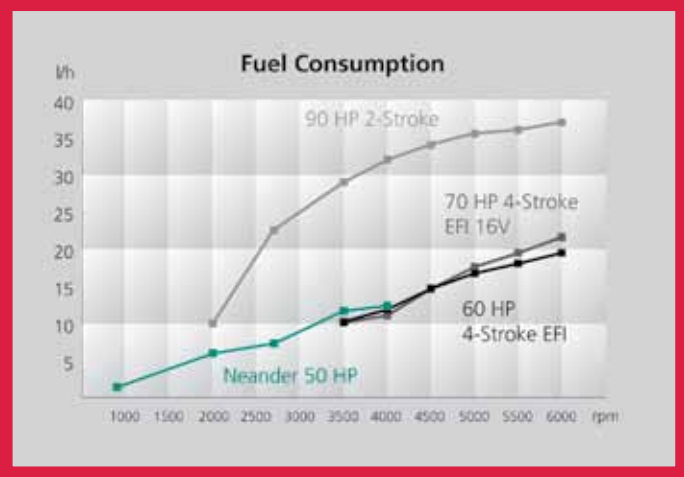
So whether you are patrolling harbours, delivering supplies afloat, transferring personnel, or checking nets, NEANDER Dtorque is the strong, reliable workhorse you need for unwaveringly reliable performance, long range, and low operating costs time after time. But for a workhorse it is also remarkably refined. Its unique dual counter-rotating crankshaft engineering means ultra-low vibration and noise, so less fatigue for the user at the end of the working day. And less stress for the engine and its suspension as well.

LONGER RANGE FOR FEWER FUEL STOPS: GREATER INDEPENDENCE AND PRODUCTIVITY.

Queuing at the fuel pump can take up valuable working time, but the frugal diesel consumption of the NEANDER Dtorque means fewer refuelling stops and lower running costs than you would expect from most gasoline outboards of 60 or 70hp with lower torque output. Its fuel consumption peaks where the gasoline burners are just starting out. Then at full throttle 2.5 times more fuel is likely to be used by the gas outboards than the diesel fuel-sipping Dtorque.

For most applications, with a NEANDER Dtorque on your transom you have all the benefits of less frequent visits to the pumps -- so less downtime, greater operational independence, more productive working hours and, when it comes to running costs, a better bottom line on the balance sheet at the end of the month.

Dtorque
II







SAFETY WITHOUT COMPROMISE. WITH FIRE RISKS, DIESEL IS A BETTER OUTBOARD OPTION.

For operational reasons in the great majority of work-boat applications, from fish farming to harbour patrol duties, offshore wind-turbine farms to charter services, the technical advantages of the Dtorque's advanced diesel engineering are clear. But for those working in environments where fire is a real hazard, such as in the offshore oil industry, diesel has the added safety benefit of low flammability.

That's just one good reason why gasoline is seldom carried on most large seagoing vessels. In the wider picture, diesel is always the sensible propulsion option for tenders to run and collect crew, passengers, and goods ashore where docking is not always practical, for example with cruise ships and mega-yachts.



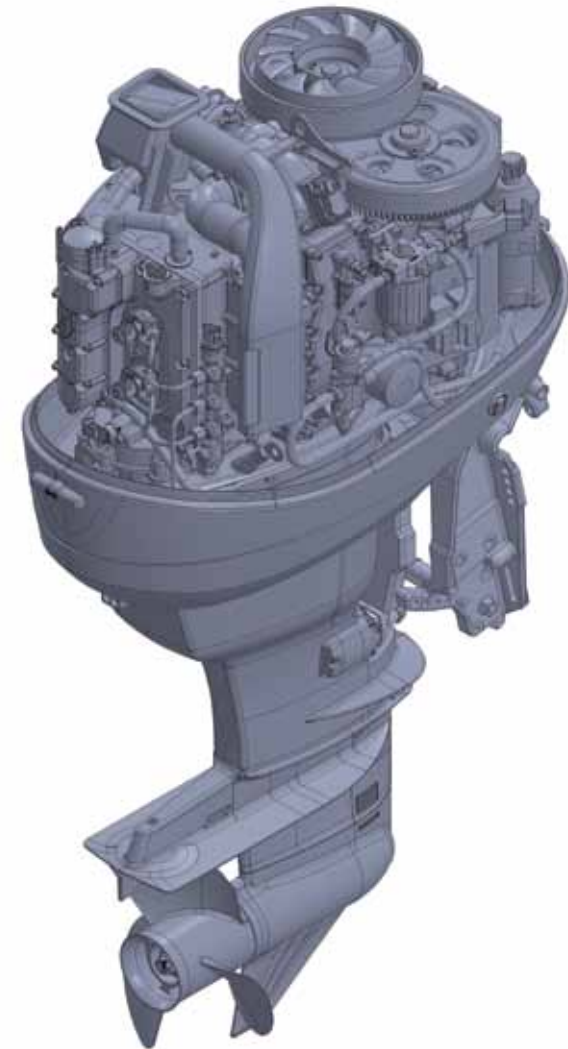
REVOLUTIONARY 'SPACEBALL' DESIGN MINIMISES ENGINE WEAR.

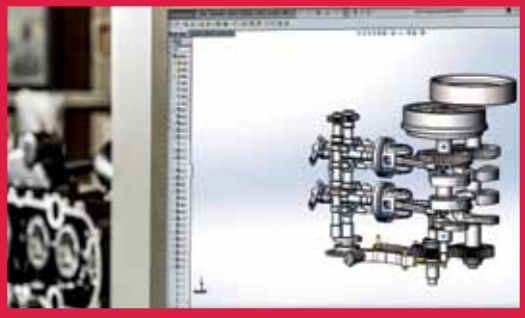
For its size, NEANDER's unique 800cm³ reciprocating two-cylinder diesel powerhead design produces an impressive 50hp. More important is its 111Nm torque output, which outstrips that of most of the latest 70hp gasoline outboards on the market. But what's most impressive is minimal vibration.

The secret behind that is the company patented 'Spaceball' design. The aluminium cylinder block houses dual crankshafts which rotate in opposite directions to absorb the considerable vibration that a conventional small two-cylinder diesel engine would normally generate.

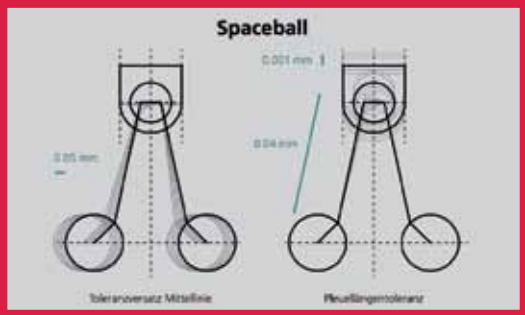
For the user, the benefits are immediately apparent. Less vibration, less noise, and lighter boat handling without having to continually wrestle with the tiller to correct for torque steering all mean less operator fatigue - and less stress on the engine, too.

The engineering refinement doesn't end there. Common-rail fuel injection -- rare indeed in diesel engines as small as this one -- and turbocharging with integrated charge air cooling are just two of a list of features which contribute to performance, fuel saving and lower emissions.

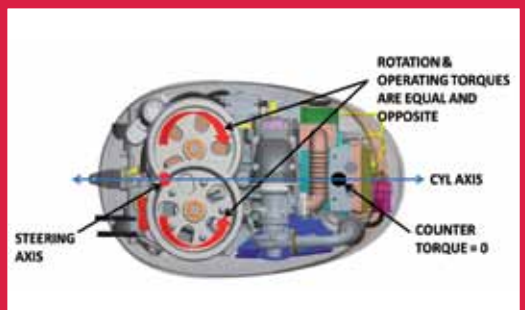




All of the moving parts of the vertically-mounted Dtorque engine are clearly seen in this CAD/CAM screen display. Central to the assembly are the dual crankshafts with their miniature counter-rotating flywheels. Light weight connecting rods are connected to crankshafts by two inline pistons, while aspiration is provided by four camshaft-driven valves per cylinder.



This two-dimensional diagram shows clearly how the two reciprocating pistons complement each other at the full extent of their up and down strokes. It may look simple, but the asymmetric engine cycle with its short compression stroke, longer intake stroke and shorter expansion stroke required particular attention from the NEANDER Dtorque engineering design team. The benefit, however, is improved thermal efficiency with an extended piston work stroke.



The end result of NEANDER's engineering design and development work is a remarkably neat and compact engine package, as seen in this overhead rendering. As in the tradition of the finest Swiss mechanical watch making, all of the vital components fit together with in a beautifully elegant and intricate symmetry.

ENGINE SPECS

Power	36,8 kW/50 hp at 3.500 - 4.000 min ⁻¹
Max. Torque	111 Nm at 2000 - 3000 min ⁻¹
Engine Type	4-Stroke turbo diesel
Balance	Dual counter-rotation crankshafts
Swept Volume	804 ccm
Bore x Stroke	80 x 80 mm
No. Cylinders	2 In-Line, twin
Intake	Water cooled turbo charger and charge air cooling
Lubrication	Integrated dry sump – pressure lubricated
Fuel	Diesel
Injection	Bosch common rail direct injection
Starting	Electric
Alternator	Standard 12 V/300 W
Cooling	NEANDER Active Thermo-Management System (ATMS)
Exhaust	Integrated underwater thru-hub propeller
Steering	Tiller / remote control, optional
Suspension	Silent-block-controlled compression and traction
Trim	Power trim
Shift	Mechanical – dog-clutch gearing
Transmission	Ratio 13/27 (2.07:1)
Available Shaft	Versions 20" and 25"
Standard Propeller Type	3-blade with built-in damper
Weight	Basic Version 175 kg (dry)

Technical data are subject of change.

RETHINKING TECHNOLOGY. FROM THE IDEA TO SERIES PRODUCTION.



LUTZ W. LESTER
Managing Director

DRIVEN BY INNOVATION

The time of glorious days for real new inventions in the area of internal combustion engines seems to be long gone. Engines become more and more efficient and offer many variations. Enthusiastic innovative genius coupled with an open mind made us rethink mature technology. The principle of the dual crankshaft concept has received a name – NEANDER.

OUR ORIGIN

Before the turn of the millennium our passion for engines has only been applied to two-wheelers. Our intention was to put the incredible torque of a turbo diesel engine on the road. Our vision was a unique motorcycle with a powerful 100hp turbo diesel engine. In 2003 this vision found a home through the foundation of NEANDER Motorfahrzeuge GmbH which has been transformed 2006 into NEANDER Motors AG.

VISION LIVED

We grow with our success. Thus the idea of using the NEANDER technology for marine came into vision. The realization of this thought took place quickly in the same year – in 2009 NEANDER Shark GmbH was founded as a 100% subsidiary of the NEANDER Motors AG. Ever since NEANDER Shark has vigorously implemented the unique concept in the marine world. Outstanding engineers and engine experts joined the NEANDER project soon.

Lutz W. Lester's talent of generating enthusiasm caused "innovators" to accept the challenge and support NEANDER. Those came with the experience from companies like Porsche, Mercury Marine and Mahle. With their know-how and energy it was made possible to explore the unknown path. The aim: The worldwide first turbo diesel outboard engine under 100hp – from the idea to series production.

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