

V O L V O

A close-up photograph of a hand on a Volvo truck's gear shifter. The shifter is black with white text and symbols. The hand is positioned on the right side of the shifter, with the thumb resting on the 'D' gear. The shifter has a 'MODE' button, a 'D' gear indicator, and a 'PULL'/'PUSH' lever. The background is dark and out of focus.

# POWERTRAIN

Volvo Trucks. Driving Progress





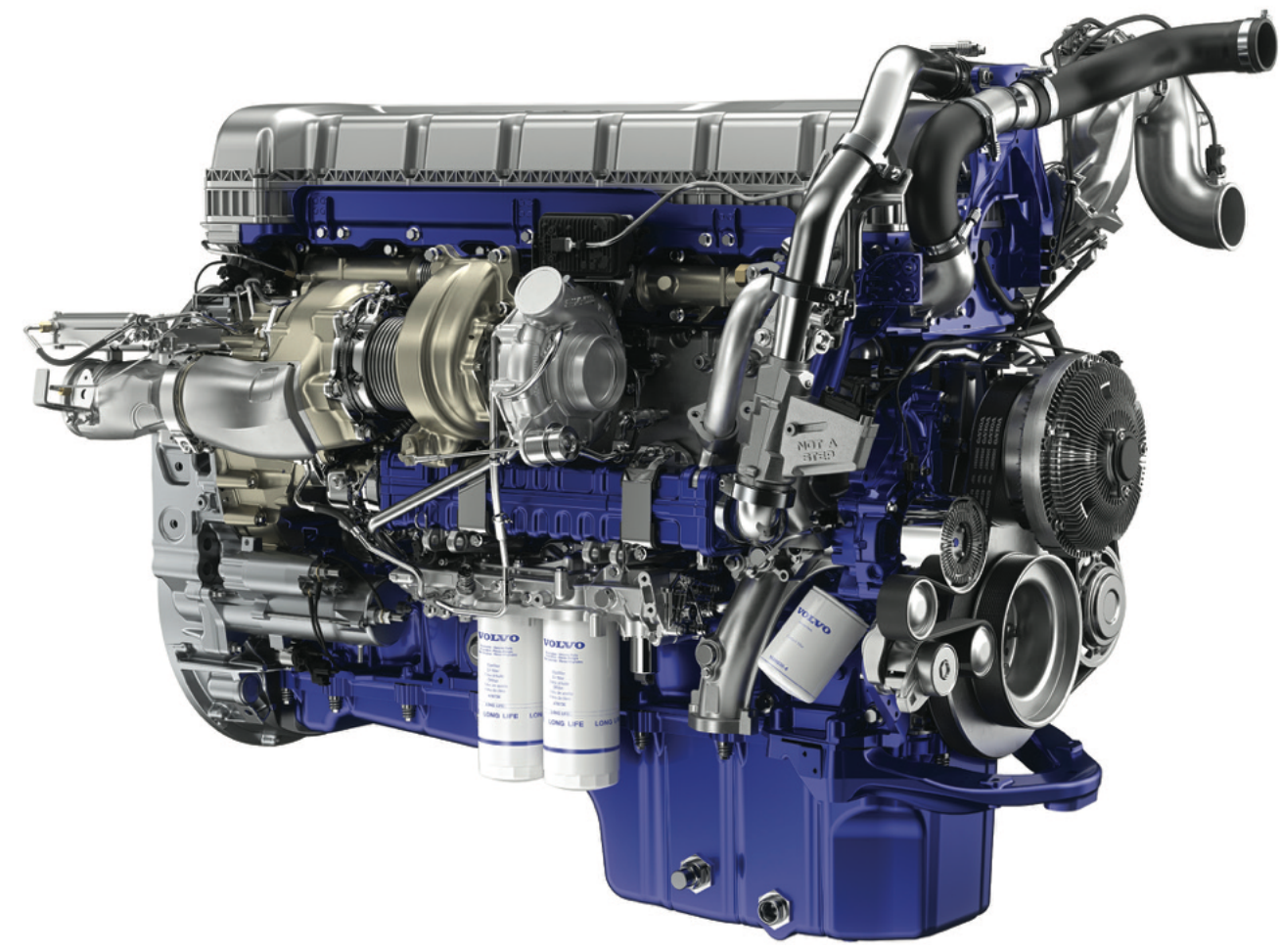
# The right powertrain for you

Volvo's ground-breaking powertrain solution begins with the D13 engine and the I-Shift automated manual transmission. This generation of Volvo Power is more functional and more efficient than ever. Our VNL and VNR models see fuel efficiency improvements of up to 3% thanks to innovations in the powertrain alone.\*

Choosing an engine and transmission that's customized to your operations continues to be the key to fuel savings. We will always strive to understand your load, route, and operation. It's how we make sure your powertrain and software settings can provide the right balance of performance and efficiency.

\* Comparison with previous model Volvo VNL and VNR respectively





## VNL engine options

The Volvo D13 engine with Turbo Compounding (TC) comes standard for the VNL and is available in ratings up to 500 hp and 1,950 lb-ft. This next-generation D13 engine recovers and harnesses lost energy, while featuring design enhancements that help you drive greater fuel savings. The D13 TC engine allows long-haul fleets to choose our popular, fuel-efficient I-Torque package.

The Volvo D13 Variable Geometry Turbo (VGT) engine is also available for the VNL in ratings up to 500 hp and 1,900 lb-ft.

Powertrain enhancements create nearly 30% of the VNL's increase in overall fuel efficiency. The D13 family of engines feature many efficiency improvements, including a new variable-speed oil pump, an enhanced piston-rod angle, and a seven-wave piston design.

	Engine Equipment	
	D13 Turbo Compound	D13 Variable Geometry Turbo
Base Engine Configuration	4 cycle / Inline 6	
Cam / Valve Configuration	SOHC / 4 Valves per Cylinder	
Cylinder Head	One Piece Rigid Deck Cylinder Head	
Injection System	Common Rail	
Maximum Fuel Injection Pressure, psi (bar)	35,000 (2,400)	
Displacement, cu. in. (L)	780 (12.8)	
Compression Ratio	18:1	
Bore & Stroke, in. (mm)	5.16 x 6.22 (131 x 158)	
Cylinder Spacing, in. (mm)	6.61 (168)	
Aspiration	Fixed Geometry Turbocharger	Variable Geometry Turbocharger
Clutch Engagement Torque (lb-ft.)	738	802
Full Dress Dry Weight, lb. (kg)	2,688 (1,218)	2,562 (1,162)
Engine Brake Rating at 1500 rpm (hp)	336	313
Engine Brake Rating at 2500 rpm (hp)	598	523

	Fuel and Lubrication	
	D13 Turbo Compound	D13 Variable Geometry Turbo
Fuel Specification	Ultra Low Sulfur Diesel, 15 ppm	
Fuel Filters	Primary plus Secondary	
Total Lube Oil Capacity, qts. (L)	35 (33)	
Oil Filtration	Two Full Flow	
Oil Drain Interval, Normal Service, miles (km)	90,000 (144,840)*	
Oil Specification	Volvo VDS-5.0, SAE 5w-30	

\* Volvo VDS-5.0 Oil : Application at 8.5 mpg and less than 20% idle time.

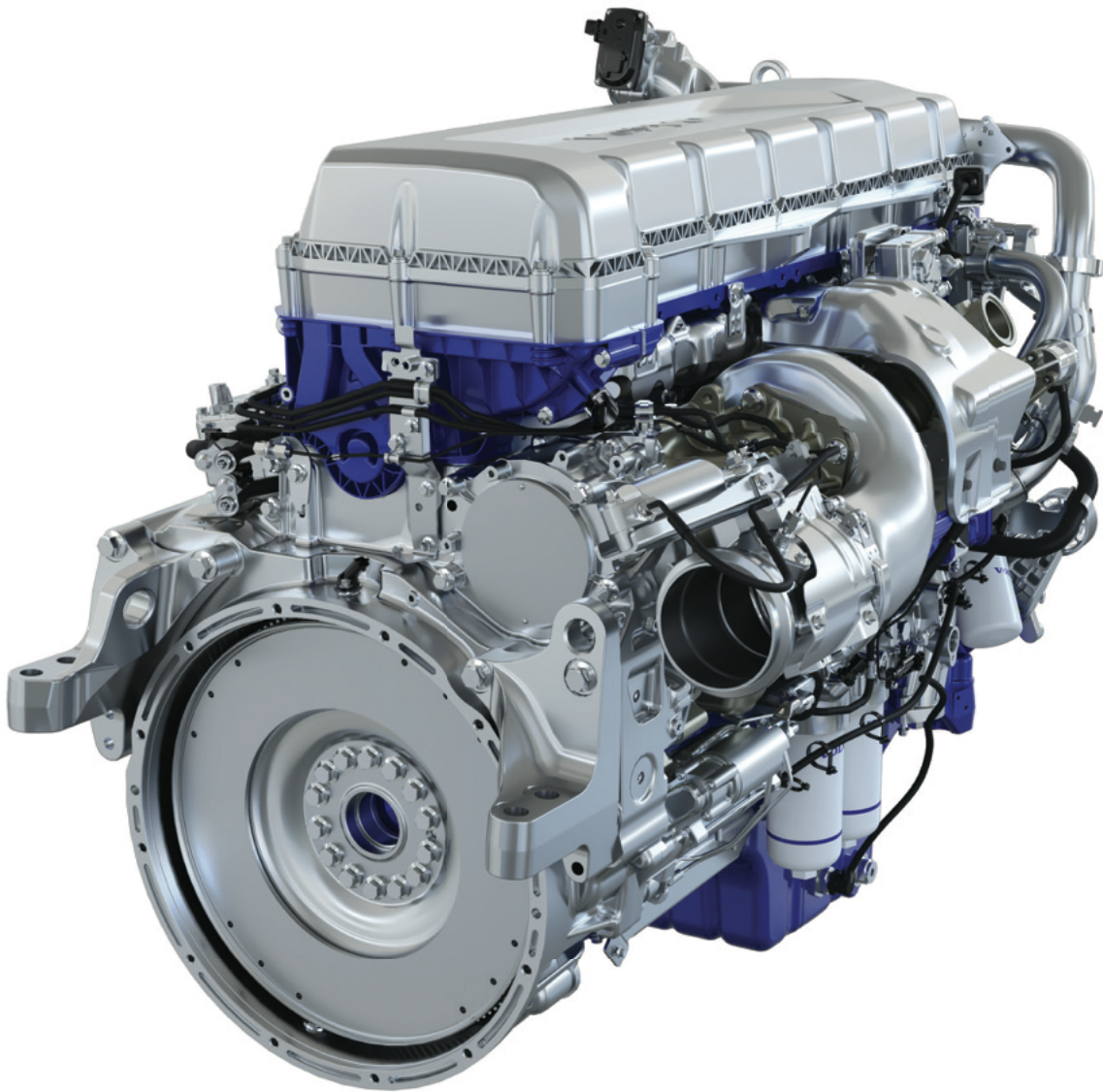
VNL Available Engine Ratings	
D13 Turbo Compound (Standard)	D13 Variable Geometry Turbo (Optional)
405 hp/1,750 lb-ft.	405 hp/1,450 lb-ft.
425 hp/1,750 lb-ft.	405 hp/1,650 lb-ft.
455 hp/1,850 lb-ft.	425 hp/1,550 lb-ft.
500 hp/1,850 lb-ft.	425 hp/1,750 lb-ft.
500 hp/1,950 lb-ft.	435 hp/1,650 lb-ft.
	455 hp/1,750 lb-ft.
	455 hp/1,850 lb-ft.
	500 hp/1,650 lb-ft.
	500 hp/1,850 lb-ft.
	500 hp/1,900 lb-ft.

	Engine Equipment	
	D13 Variable Geometry Turbo	D13 Turbo Compound
Base Engine Configuration	4 cycle / Inline 6	
Cam / Valve Configuration	SOHC / 4 Valves per Cylinder	
Cylinder Head	One Piece Rigid Deck Cylinder Head	
Injection System	Common Rail	
Maximum Fuel Injection Pressure, psi (bar)	35,000 (2,400)	
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	D13 Variable Geometry Turbo	D13 Turbo Compound
Fuel Specification	Ultra Low Sulfur Diesel, 15 ppm	
Fuel Filters	Primary plus Secondary	
Total Lube Oil Capacity, qts. (L)	35 (33)	
Oil Filtration	Two Full Flow	
Oil Drain Interval, Normal Service, miles (km)	90,000 (144,840)*	
Oil Specification	Volvo VDS-5.0, SAE 5w-30	

\* Volvo VDS-5.0 Oil : Application at 8.5 mpg and less than 20% idle time.

VNR Available Engine Ratings	
D13 Variable Geometry Turbo (Standard)	D13 Turbo Compound (Optional)
405 hp/1,450 lb-ft.	405 hp/1,750 lb-ft.
405 hp/1,650 lb-ft.	425 hp/1,750 lb-ft.
425 hp/1,550 lb-ft.	455 hp/1,850 lb-ft.
425 hp/1,750 lb-ft.	
435 hp/1,650 lb-ft.	
455 hp/1,750 lb-ft.	
455 hp/1,850 lb-ft.	



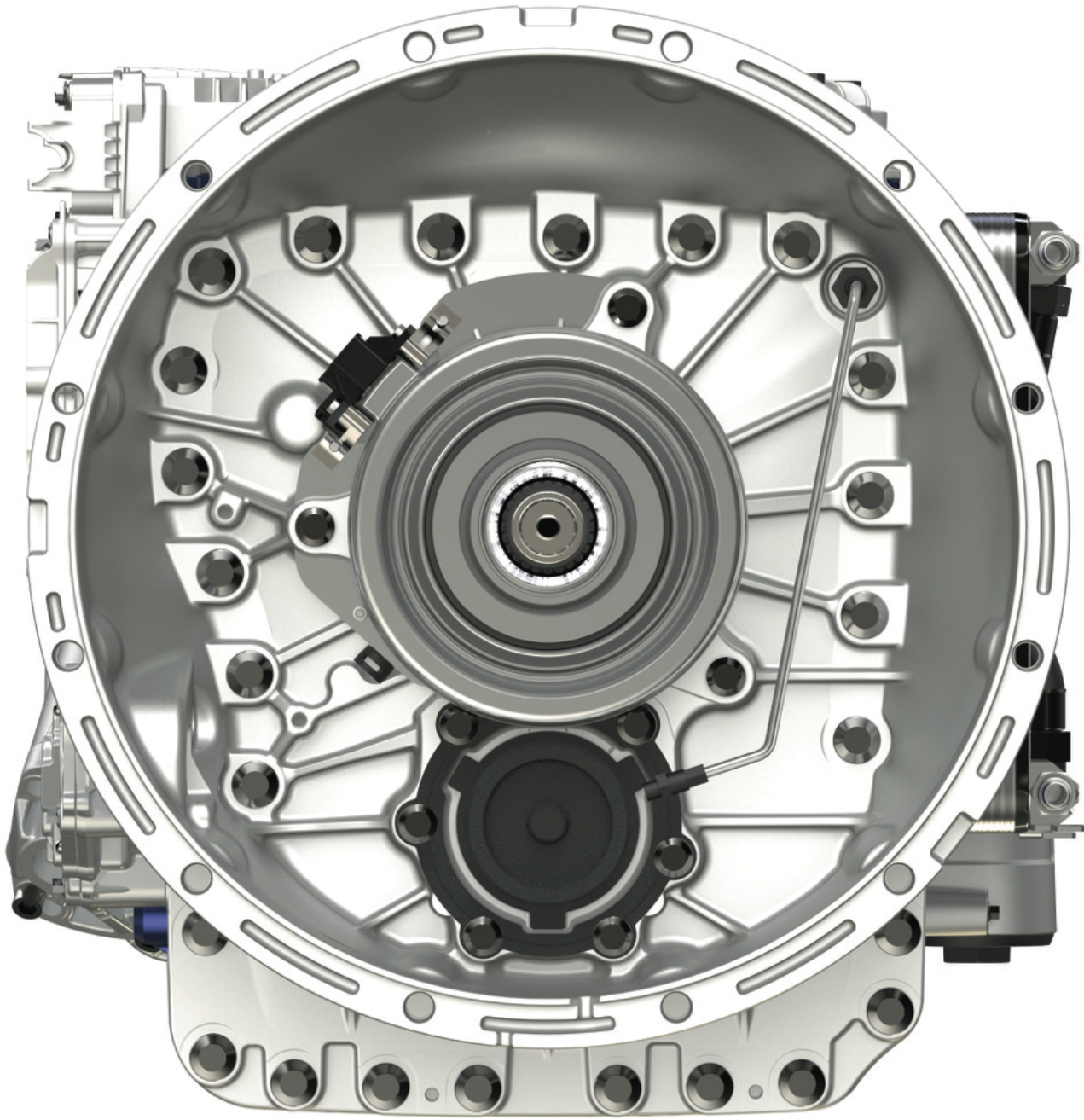
## VNR engine options

The all-new VNR comes standard with the D13 VGT engine, which is ideal for local and regional routes that feature multiple daily stops. The D13 VGT is available in ratings up to 455 hp and 1,850 lb-ft. for the VNR.

The Volvo D13 TC engine is also an option in the VNR for fleets that may spend more of their time operating at highway speeds. The D13 TC is available for the VNR in ratings up to 455 hp and 1,850 lb-ft.

In the VNR, powertrain enhancements account for nearly 40% of the vehicle’s overall increase in fuel efficiency.





## Volvo I-Shift

Every new VNL and VNR comes standard with the innovative Volvo I-Shift automated manual transmission. It helps drivers of all experience levels improve fuel savings and reduce equipment wear. I-Shift now features improved electronics. It pushes the limits of fuel efficiency through downspeeding. This allows an optimum engine speed as low as

950 rpm. The integrated powertrain works in unison to precisely match engine speed to road conditions. A new clutch delivers greater durability, while shifting speed has been increased by 30%. The new transmission oil level sensor broadcasts information to the instrument cluster, warning the driver if the transmission oil level is low.

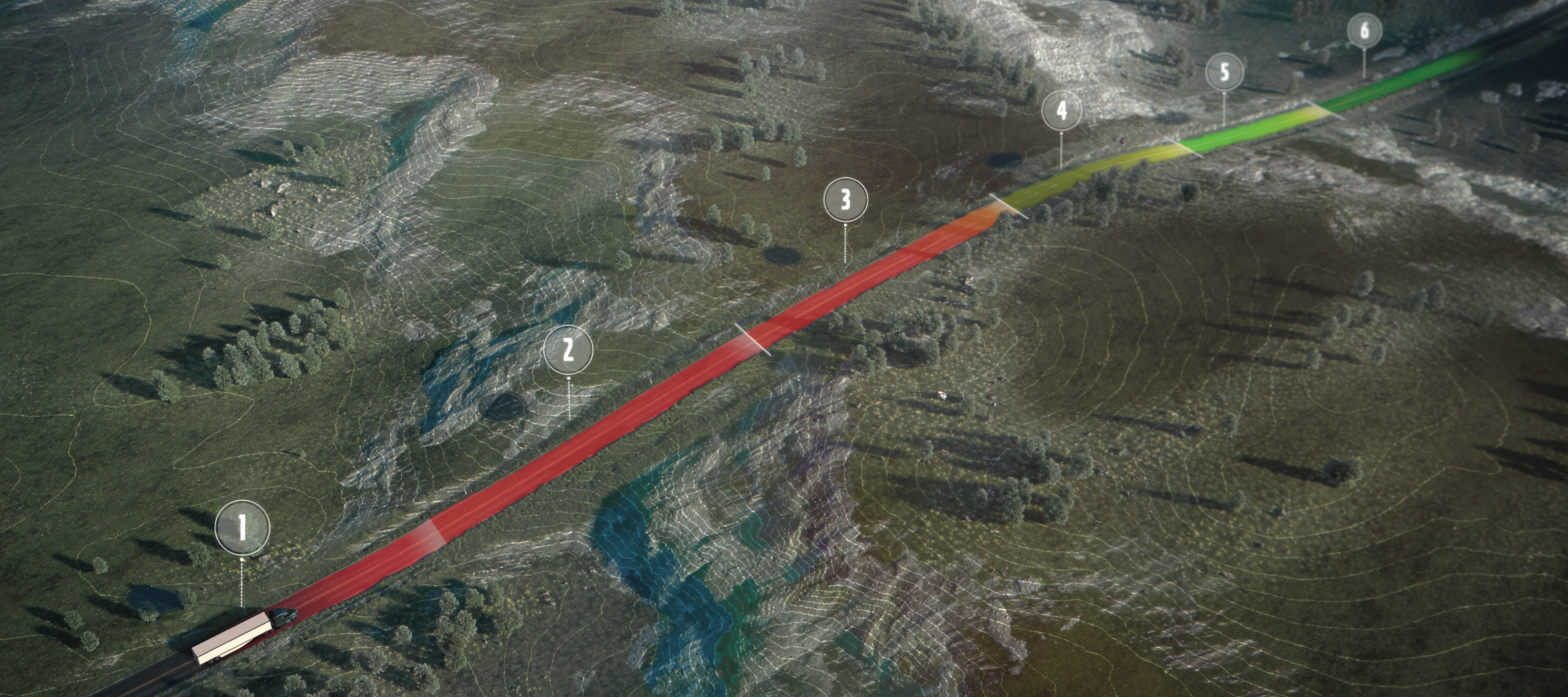
	Volvo I-Shift				
	Direct	Overdrive	Direct	Overdrive	Overdrive
Forward gears	12	12	13	13	14
Reverse gears	4	4	6	6	6
Dry Weight w/clutch and oil cooler	719 lbs.	719 lbs.	805 lbs.	805 lbs.	805 lbs.
Max torque capacity	1950 lb-ft.	1950 lb-ft.	1950 lb-ft.	1950 lb-ft.	1950 lb-ft.
Transmission housing body	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum
Maximum highway weight	143,000 lbs.*	143,000 lbs.*	143,000 lbs.*	143,000 lbs.*	143,000 lbs.*
Oil capacity approx.	Approx 18 qts. (17 L)	Approx 18 qts. (17 L)	Approx 20.8 qts. (19.68 L)	Approx 20.8 qts. (19.68 L)	Approx 20.8 qts. (19.68 L)
Overall ratio	14.94:1	14.94:1	19.38:1	22.34:1	40.8:1
Power launch feature	✓				
Fully integrated driver display	✓				
Downhill economy mode	Eco-Roll				
Topography optimization capability	I-See® predictive cruise				
Shifter position	Stalk mounted				
Gear selector positions	Reverse, neutral, drive, manual				
Kick down	✓				
Grade sensor	✓				
Load sensor	✓				
Trailer detection	✓				
Monitored by remote diagnostic	✓				
Remote programming OTA	✓				
Hill start assist	✓				
Skip shift	✓				
Low-speed operation	Idle drive				
Auto neutral	✓				
Intelligent shifting	✓				
Transmission warranty — normal duty	5 yrs/750K miles				
Clutch warranty — normal duty	3 yrs/350K miles				
Oil drain interval	5 yrs/500K miles				
Enhanced transmission PTO	✓				
Driver-controlled economy and performance modes	✓				

*\*I-Shift capable of up to 220k GCW for Heavy Duty and Severe Duty Transmission Warranty. 143,000 lbs is maximum highway weight in VNL or VNR models. Application approval required from sales engineering for higher GCWs.*









# Torque packages

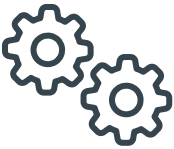
Volvo offers three distinct torque packages to meet your needs: Super direct, Straight torque, and I-Torque. Super direct provides excellent startability. It's ideal for urban and regional applications run at lower speeds with more frequent stops. Straight torque is designed for customers hauling heavier loads (80,000-143,000 lbs.), who are primarily concerned about performance.

I-Torque is a versatile powertrain solution enabling your truck to operate optimally at high and low road speeds. I-Torque maximizes the potential of both the D13TC and Volvo I-Shift to achieve greater efficiency, even when roads and loads vary. It combines the benefits of Direct Drive and Overdrive, using the best features of each at appropriate points in the route.



I-See®

I-See predictive cruise control now comes with pre-loaded maps in the new VNL and VNR to see and analyze upcoming road conditions. I-See anticipates gear, speed, and engine brake adjustments to deliver optimum fuel efficiency.



Low rear-axle ratios

One of the secrets to improved fuel efficiency in our torque packages is the option of a lower rear-axle ratio, which decreases demand on the engine. You'll also see excellent startability is maintained when using I-Shift's 13-speed configuration.



## History repeats itself

The first VN debuted in North America in 1996 and quickly turned the trucking industry on its head. Other truck makers spent the next decade playing catchup to our innovations. The all-new Volvo VNL and VNR represent another leap forward, with hundreds of next-generation features you can use to improve your productivity and profitability.

**In addition to the powertrain innovations covered in this brochure, here are some additional highlights in our next generation vehicles:**

- Revolutionary aerodynamics and powertrain innovations that improve fuel efficiency by up to 10% in the VNL family and up to 7.5% in the VNR family as compared to previous models
- Industry leading connectivity that powers the new My Truck App and Volvo's exclusive E-Call emergency response system
- The first-of-its-kind, all-inclusive Volvo Blue Service Contract with predictive maintenance to improve uptime
- Interior and exterior design that stops you in your tracks, conveniently packaged into trim levels for easy decisions





**V O L V O**

Some vehicle options and services may not be available at time of introduction.  
Some vehicles shown with optional equipment. All specs current at time of publication release.  
Performance data based on engineering calculations and real-world data.

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