

Polestar 1 – European test drive media information

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Vehicle overview

Polestar 1 is an Electric Performance Hybrid, a combination of concept car looks, a cutting-edge drivetrain and driver-focused dynamics. With this car, Polestar sets a new direction, redefining electric performance and spearheading design and technology, not only for its own products but for the automotive industry at large.

Polestar 1 is a beautiful carbon fibre-bodied grand tourer with an electric-first hybrid drivetrain. With a double electric rear axle and a 34 kWh battery, the Polestar 1 offers up to 125 km* (78 miles) of electric range on the WLTP cycle – well above average daily driving requirements. This is a hybrid car that can be driven every day on electric power alone.

A two-litre turbocharged and supercharged petrol engine adds both range and performance to deliver a genuinely exciting drive. Total combined output is 609 hp and 1,000 Nm (738 lb-ft) of torque, with real torque vectoring ensuring ultimate control and accuracy.

For Polestar, performance is more than just speed and power. Performance also manifests itself in the way the car is designed, from body construction and exterior surfaces to the cosseting driver-centric interior. Design is at the core of everything we do. From our communications to the places we work, and of course our cars – design inspires us to think differently and deliver excellence.

Design

The design of Polestar 1 is based upon the much-praised Volvo Concept Coupé. The great source of inspiration for the Concept Coupé was the Volvo P1800, today a classic design icon. With this inspirational design and the tremendous reception that the Concept Coupé gathered, the Polestar design team was able to implement a new, modern take on the classic GT shape to produce Polestar 1.

When the decision was taken to make the entire body of the production car from carbon fibre reinforced polymer (CFRP), it gave our designers even more freedom to create what they really wanted. Carbon fibre made it possible to create crisper lines and sharper creases for a modern, technical look. This can, for example, be seen in the bonnet and fenders. It also enabled the powerful shape of the rear haunches, reminiscent of those on the Volvo P1800.

The single-piece bonnet gives Polestar 1 a premium look, without any intrusive shut lines to break its sensual surface, while the shut lines on the sides emphasise the distance between the front wheels and doors. This adds to the powerful, dynamic profile. Wheels are 21-inches front and rear.

The long doors contribute to the well-proportioned coupé design and facilitate ingress and egress in the rear. The integrated door handles add to the clean aesthetic and contribute to aerodynamic efficiency. The look is completed by the frameless side mirrors, which improve aerodynamic efficiency by 30% over conventional framed mirrors and add to the aesthetic appeal.

At the rear, the c-shaped tail lights present a strong visual statement and emphasise width, sitting above a wide rear valence with integrated carbon fibre diffuser. A mechanical rear wing is integrated into the boot lid and rises automatically at cruising speeds above 100 km/h, and can be manually raised and lowered.

Low, sleek and wide – Polestar 1 is the embodiment of an avant-garde GT. It features a driver-centric and luxurious interior with a focus on technology and comfort, but without compromising on performance. From the responsive portrait touchscreen and carbon fibre décor elements, to the Bowers & Wilkins premium audio system with 15 speakers and the handmade Orrefors crystal gear selector with unique Polestar logo etched inside the lever, the details define this vehicle. The Polestar logo is also reflected onto the panoramic glass roof from the overhead console, a nod to our vision of being a guiding star.

Chassis and body

At the core of the Polestar 1 is the SPA (Scalable Product Architecture) platform. This is then reinforced by the ‘dragonfly’ – a specialised carbon fibre cross member that increases rigidity by 60% and adds strength to the chassis.

The body is then constructed around this platform in carbon fibre reinforced polymer, or CFRP, which not only allows for a reduction in weight and a lower centre of gravity, but also a sleeker profile.

The roof cantrail section, reaching from the base of the A-pillar to the C-pillar side member, consists of an extremely rigid carbon fibre tube, which is baked into the outer structure of the carbon fibre pillar construction.

The roof cross-sections are slim, light and stiff carbon fibre profiles. This is a major contrast to conventional steel roof construction, where all sections would need to be bigger and thicker, the roofline would have been higher, and the side glass more upright, in turn compromising the beautiful design. Even the construction of the panoramic glass roof allows for a lower roofline. There is also no visible antenna.

The inner body side panels, outer body side panels, doors, front fenders, hood, boot lid and rear parcel shelf are all crafted in carbon fibre.

The carbon fibre body ultimately results in three major benefits:

- Weight reduction: 230 kg (506 lb) less weight by building with carbon fibre and modifying the existing SPA underbody.

- An increase in body stiffness: the torsional stiffness of the body structure has increased by 45%, resulting in better handling and overall performance.
- Centre of gravity: by keeping the heavier steel construction in the floor, and everything higher in light-weight carbon fibre, the centre of gravity is lowered for Polestar 1 which results in better handling and performance on the road.

Suspension and braking

Polestar believes performance is not just about straight-line acceleration and speed. Development engineers have worked tirelessly to create the sort of ride and handling that will really reward drivers. The car feels connected to the road; firm, but not harsh. After all, this car has the ability to cover significant distances.

To develop this purity of drive, Polestar 1 does not employ an overly complicated electronically controlled suspension system. Instead, Öhlins Dual Flow Valve (DFV) manually adjustable dampers are at the heart of this performance. In close collaboration with Öhlins, the team has tested and developed the entire setup across continents and in extreme environments to ensure that Polestar 1 drives the way only a Polestar should.

The DFV gives the shock absorber the same characteristics on rebound as it does on compression, due to the damper fluid having a consistent flow path in both directions. This means each wheel can quickly and effectively resume its position back on the ground to maintain grip and traction. Because the DFV opens quickly over minor road imperfections, general ride comfort is supple and more akin to an OEM strut rather than a coil setup. Over undulating surfaces, the compliancy of these dampers allows the car to crest bumps and other more serious road imperfections with increased control and stability. Traction is always maintained at an optimal level.

The front suspension is of a double wishbone design, with a multi-link set-up at the rear.

Stopping power is of course just as dynamically important as horsepower. The Polestar 1 has exceptionally powerful brakes. The front brakes are manufactured by Akebono – the six-piston aluminium monoblock callipers on each front wheel are milled from one solid piece. The callipers are coupled with 400 x 38 mm discs, both ventilated and drilled for efficient cooling. Rear brake discs are also ventilated, measuring 390 mm.

Powertrain and performance

The powertrain in the Polestar 1 is probably its most unique attribute. Electric first and combustion second, this hybrid drivetrain favours electric power from a double electric rear axle configuration, supported by an internal combustion engine on the front axle. This being a GT, the hybrid powertrain offers the perfect solution for long distance cruising.

Two 85 kW electric motors on the rear axle give Polestar 1 a total of 170 kW, or 232 hp, of pure electric power. In everyday scenarios Polestar 1 can be driven as a fully electric vehicle, the 480 Nm (354 lb-ft) of instant electric torque enabling brisk acceleration without the need to introduce the combustion engine, even at full throttle.

When necessary or desired, the 2.0-litre turbocharged and supercharged petrol engine at the front adds its own contribution with 309 hp (227 kW) and 435 Nm (321 lb-ft). Together this system provides the ultimate mix of torque, power and cruising range.

A 52 kW (68 hp) and 161 Nm (119 lb-ft) crank-integrated starter generator (ISG) also lies between the crankshaft and the combustion engine to act as a starter motor and provide additional electric torque when the internal combustion engine is in use, including during gear changes. This also allows the petrol engine to charge the batteries up to 80% if desired or required.

Each rear wheel has its own electric motor and planetary gear set that enables real torque vectoring – a specialised method of allowing for both acceleration and stability when tackling a curve. Instead of slowing the inner wheel to improve accuracy in a curve, the outer wheel is accelerated to compensate for the difference in curve radii between both wheels. This allows the driver to apply power earlier in the corner while maintaining stability and accuracy.

Polestar 1 has two battery packs. One is located between the front seats in the traditional ‘transmission tunnel’, the other above the rear axle. The unique battery pack positioning enables ideal 48:52 overall weight distribution for the car. Total battery capacity is 34 kWh – enough to provide the Polestar 1 with up to 125 km* (78 miles*) of electric driving range on the WLTP cycle. This outperforms any plug-in hybrid on the market and gives the Polestar 1 its unique ability to be used effectively as an electric car.

Polestar 1 can be driven at speeds up to 160 km/h (100 mph) on electric power alone. The immediacy and high output of the electric torque also makes the car’s electric performance both fun and practical.

The combined electric and combustion powertrain produces a total of 609 hp and a maximum of 1,000 Nm (738 lb-ft) of torque. With the immediacy of the electric torque at the rear and the long legs provided by the petrol engine at the front, power delivery is always smooth and seamless – and the resulting performance is excellent.

0-100 km/h (0-62 mph) takes just 4.2 seconds. Perhaps most impressive is the 80-120 km/h (50-75 mph) rolling acceleration time of just 2.3 seconds, the electric drive providing instant response when on the move especially. Top speed is limited to 250 km/h (155 mph), or 160 km/h (100 mph) in electric-only mode.

An active rear spoiler is featured on the Polestar 1, rising automatically at 100 km/h (62 mph) and retracting at 70 km/h (44 mph). It can also be manually adjusted.

Safety

Safety is a hallmark of the Volvo Car Group and another element of performance for Polestar. Naturally, the Polestar 1 is engineered to the highest safety standards and has been tested thoroughly not only in computer simulations, but also in the crash lab in Sweden.

In fact, the Polestar 1 was the first-ever crash test of a carbon fibre-bodied car for the Volvo Car Group. In doing so, crash safety engineers were able to experiment with the new material to gain an elevated understanding of how its behaviour differs from conventional steel.

In contrast to a steel body, where bending helps the integrated crumple zones reduce the amount of crash energy that reaches the vehicle's occupants, carbon fibre dissipates energy by cracking and shattering.

Close attention was paid to the way the carbon fibre body reacted to the extreme forces involved in the impact. The engineers also focused on how the underlying steel body structure and carbon fibre 'dragonfly,' which strengthens it, managed the forces.

Most of the energy was absorbed by the car's crash structure, with the remaining energy mitigated by the carbon fibre body panels into the body structure. These panels remained rigid and did not show signs of bending or misalignment after the crash.

All available safety aids and driver assistance features are also included as standard in the Polestar 1 – including Pilot Assist which allows for a relaxed drive over long distances and especially in traffic jams. Seven airbags are fitted as standard.

Packaging and customer offer

Polestar 1 is an exclusive Electric Performance Hybrid that gives new meaning to a curated driving experience. Polestar likes to keep things simple and this is evident in the customer offer. The Polestar 1 doesn't come in 'base model' guise. It also doesn't have an extensive options list. It is produced with the best equipment all fitted as standard.

Polestar offers a simplified matrix of colours and materials that allows customers to make an easy, hassle-free purchase. Five exterior colours are each available in either a gloss or matte metallic finish. The Polestar emblems on the front and rear of the car match the exterior body paint colour in a matte finish, adding a subtle, elegant touch. Three wheel finishes are available – diamond cut, matte black or glossy black – along with a choice of either chrome or glossy black brightwork, and Charcoal or Zinc Nappa leather for the front seats. That's it.

All available equipment is fitted as standard and all the above items are no-cost options, with the exception of matte paint.

Pricing and delivery

Pricing for Polestar 1 in European launch markets is as follows:

- Sweden SEK 1,699,000
- Norway NOK 1,665,000
- UK GBP 139,000
- Germany EUR 155,000
- Belgium EUR 157,500
- Netherlands EUR 159,500

These 'on the road' prices include VAT and other local taxes. Additional delivery fees may apply.

Production of customer vehicles has started at the bespoke Polestar Production Centre in Chengdu, China, with initial deliveries to European customers due by the end of 2019.

Conclusion

This is not just a new performance GT. In fact, this is not just another new halo car. This is the car with which Polestar sets out its vision for the future. This is Polestar challenging industry conventions, from the boutique Polestar Spaces where customers can get to know the brand, to the digital business model that promotes a hassle-free ownership experience.

This is Polestar 1.

ENDS

*Preliminary data

For the complete Polestar 1 European test drive press kit, visit:
<https://plstr.car/polestar-1-florence-presskit>

For all other Polestar media information, visit:
media.polestar.com

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About Polestar

Polestar is the electric performance car brand jointly owned by Volvo Car Group and Zhejiang Geely Holding. Polestar enjoys specific technological and engineering synergies with Volvo Cars and benefits from significant economies of scale as a result. This facilitates the successful design, development and production of separately-branded, electric performance cars.

Polestar launched in 2017 with the Polestar 1 – a low-volume Electric Performance Hybrid GT with 600 hp, 1,000 Nm and an electric-only range of 150 km – the longest of any hybrid car in the world. In 2019, the Polestar 2 was revealed as the company's first full electric, higher volume premium car designed to compete around the Tesla

Model 3. In the future, Polestar 3 will join the portfolio as a fully electric performance SUV.

Polestar also applies its technology and expertise to electrified Volvo cars. The new Volvo S60, V60 and XC60 T8 Polestar Engineered models feature key Polestar components to create a sharper and more engaging driving experience. Polestar optimisation software upgrades are also available for Volvo models, which enhance six performance areas including engine output. Polestar Engineered media information can be found on the Volvo Cars media website.