



Information

Saab 9-4X BioPower Concept - Powertrain

Rightsizing and Bioethanol for Responsible Performance

The Saab 9-4X BioPower Concept demonstrates the potential of 'rightsizing' by showcasing a 2.0-liter, four-cylinder turbo engine optimized for bioethanol (E85) fuel to give 300 hp and 400 Nm (295 ft.lbs.) of torque - an exceptional level of power efficiency.

Leveraging an unrivalled 30 years experience in turbo technology, Saab leads the automotive industry in exploiting the performance and environmental benefits of bioethanol fuel. Its current BioPower models are the top-selling flex-fuel vehicles in Europe, especially appreciated for offering both more power and producing less CO₂ emissions when operating on E85 fuel compared to when fueled by only gasoline. In the future, E85 using bioethanol produced from cellulose has the potential to significantly reduce the CO₂ emissions on a source-to-wheel basis compared to only using gasoline.

Now, with the announcement of the Saab 9-4X BioPower Concept, Saab takes the next step in the development of responsible performance by partnering, for the first time, its BioPower technology with all-wheel-drive (Saab XWD).

The lightweight, aluminum, four cylinder engine is optimized for E85 fuel (85% bioethanol, 15% gasoline) to give an exceptionally high specific power output of 150 hp per liter cylinder volume, together with an equally impressive 400 Nm (295 ft.lbs.) of torque (245 hp and 353 Nm (260 ft.lbs.) - on gasoline).

E85 has a higher octane rating than gasoline, making it more resistant to harmful pre-detonation, or 'knocking', when the fuel/air mixture is compressed in the cylinder. To fully exploit this advantage, the engine has a raised compression ratio, 10.5:1, instead of 9.2:1 for a gasoline-only application. It



retains its flex-fuel capability because the Saab engine management system adjusts the ignition timing and turbo boost pressure to ensure there is no pre-detonation with gasoline.

Engine efficiency is also improved by the use of direct injection (DI) and continuously variable valve timing (VVT) on both the inlet and exhaust sides. DI delivers fuel directly into the combustion chamber, providing a more efficient combustion of the fuel/air mixture to give more power and enhanced engine efficiency.

VVT enhances turbo response at low engine speeds, as well as contributing to an even wider spread of torque. On E85 fuel, that impressive 400 Nm (295 ft.lbs.) of torque is generated all the way from 2,600 to 5,100 rpm, with 85 % available from just 2,000 rpm. Whilst these headline figures may be matched by a much larger, naturally-aspirated engine, that characteristic 'tidal wave' of low-end torque is unique to the turbocharged power delivery.

The cutting edge all-wheel-drive system, Saab XWD, soon to be launched in the 9-3, is designed to optimize vehicle responsiveness and stability. It features active management that not only splits torque delivery between the axles, but also between the rear wheels via an electronically-controlled rear limited-slip differential (eLSD). This can transfer up to 40% of torque between the rear drive shafts, to whichever wheel has more grip. Such active drive torque management improves both cornering and stability by making the rear of the car more closely follow the direction of the front wheels.

Driving enjoyment can be further enhanced by the selection of 'Sport' or 'Comfort' modes as an alternative to the vehicle's standard chassis settings. 'Sport' mode stiffens the action of the dampers for greater body and wheel control; sets the gearshift points of the automatic transmission at higher engine speeds for sportier driving; sends more torque to the rear axle for greater agility; increases the sensitivity of the electronic throttle and, at higher speeds, reduces the power assistance to the steering, thereby increasing steering feel for the driver.

Responsible performance also means including advanced safety features. In addition to a full arsenal of electronic stability and braking systems, the Saab 9-4X BioPower Concept features roll-over sensing for deployment of the curtain airbags. The front seats are also fitted with new, Generation III Saab Active Head Restraints (SAHR), including a revised head restraint movement to help reduce the risk of severe neck injury.

###

<http://media.saab.com>