



Information

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30 Years of Saab Turbocharging

How Saab Led the Turbo Charge

The idea that 'less is more' is intrinsic to the minimalist tradition of good Scandinavian design. Decoration and ornate detail can sometimes distract from an appreciation of form, line or shape. While this Scandinavian perspective is very much part of Saab car design, the 'less is more' philosophy can be even more closely identified with Saab's mastery of the art of turbocharging.

It was Saab who put turbocharging on the automotive map. It all began exactly 30 years ago when the first Saab turbo model was revealed at the Frankfurt Show. At that time Saab was alone in pursuing turbocharging as a reliable and realistic means of extracting more power and efficiency from a production engine. Saab's success over the next three decades shows that imitation is, indeed, the sincerest form of flattery, because there are few manufacturers who do not now offer turbocharged models.

That's because the attractions of turbocharging are even more seductive today than they were three decades ago. It is the key to what Saab calls 'rightsizing'. Less is more. A turbocharged engine is lighter, smaller and more fuel efficient than a non-turbo, 'naturally-aspirated' engine capable of producing similar power. Not only that. A turbocharger develops more power by harnessing the energy from an engine's exhaust gas flow. The idea of, in effect, recycling energy that's otherwise wasted is even more compelling.

Something for Nothing

While engineers will tell you that 'getting something for nothing' is not a realistic expectation in engine design, most will agree that about 30 per cent of the energy released when an engine burns fuel goes down the tube, or, in this case, the exhaust pipe. A turbocharger uses that energy to force more air into the engine. Of course, some more fuel has to be added when extra air is pumped in, but a turbo gives the driver a choice in the matter.



As Saab's leading expert, Dr Per Gillbrand, often known as the 'father of the production turbo', used to say: a turbocharged powerplant is really 'two engines in one.' There is a 'small' engine for driving in everyday traffic conditions and then a 'large' one, giving more power and performance, when the turbocharger joins the party at higher throttle openings.

Today, Saab remains at the forefront of turbocharging technology. In a world seeking to reduce CO2 emissions from fossil fuels, Saab BioPower engines bring together turbocharging and bioethanol (E85) fuel to drastically reduce those emissions - while also producing more power than is possible with gasoline. A smart, win/win solution.

Back at Frankfurt in 1977, the sceptics were more concerned about turbocharging being a winning solution in terms of just power. Early attempts at controlling boost pressure had produced severe reliability issues that discouraged other manufacturers from further development for road-going production cars.

But Saab, driven forward by the independent mind-set of its engineers and executives, remained convinced that it could be done. The company was able to draw on experience from aircraft design, where turbochargers were commonly used in aero engines to compensate for the effects of thin air at altitude. It also shared knowledge with colleagues in what was then the company's truck division, who were using turbochargers with large, heavy-duty diesel engines.

Challenging Conventional Wisdom

Saab developed technology to 'tame the turbo' by using a by-pass valve to control the build-up of boost pressure. It did not take long for the world to appreciate what had been achieved. Fitting a turbocharger to the 2-liter engine of a Saab 99 gave 23 per cent more maximum horse power and a massive 45 per cent increase in torque, the engine's pulling power under acceleration. To produce similar power ratings, a naturally-aspirated engine of the time would have been up to 50 per cent larger in capacity and about 50 kilos heavier, with overall fuel consumption 30 per cent worse. Saab has changed conventional wisdom that equated engine power with engine size.

An early Saab 99 Turbo road test in the UK's influential Autocar magazine concluded: "It is not just its performance, but the way it delivers it. Its acceleration pattern is unique. Like a roller coaster running downhill, the Saab just gets faster as the turbocharger boost increases. It's uncanny." The

age of the turbo had arrived and, during the next decade, black Saab 99 and 900 Turbo models were to become defining image for the Saab brand.

Over the years, Saab has continued to refine the art of turbocharging. The roller coaster is still there, but the ride is a bit more comfortable. Advances in engine management systems and turbocharger design have given today's Saab turbo engines a much smoother and more progressive power delivery. The new Turbo X, for example, delivers exceptionally strong pulling power of 400 Nm from very low engine revs, the characteristics of a far larger engine.

Rightsizing

Turbocharging has led Saab 2,650 meters (8,700 ft) up in the American Rockies to demonstrate how its turbo cars can still perform in the thin air of altitude. And down at sea level, it has given the 9000 Aero model faster in-gear acceleration than a Ferrari Testarossa. There is even a satisfied Saab 900 Turbo owner who has clocked up more than one million miles.

As long ago as 1992, Saab was able to demonstrate the abilities of its Trionic engine management system (Generation 8 is used today) by arranging an independent car test in City of London traffic. It showed that levels of regulated pollutants in the Saab's exhaust were actually lower than found in the surrounding atmosphere. The car was 'cleaning' the urban air!

Today, in an era when the desire to save energy and achieve greater efficiency has never been greater, the future of Saab turbocharging has never been brighter.

'Rightsizing' is how Saab describes the process of making engines more efficient, of reducing their size, weight and environmental impact without losing performance .. showing that less is more. Turbocharging is a key component, combined with sophisticated engine management, 'lean burn' technologies and the potential use of bio-fuel, such as Saab BioPower and E85 bioethanol.

Back to Saab turbo pioneer Dr Per Gillbrand. He shared a similar philosophy when it came to efficient engine design. "All engines have an oil pump, a fuel pump and a water pump", he used to say. "So why not an air pump, which is all a turbo really is. I think it's odd that all engines don't have one!" Nowadays, thanks to the power of such independent thinking, an increasing number do.

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