

Turbo That Is Out of This World

The new Porsche 911 Turbo has breathtaking power and makes use of new technology previously considered unviable. In order to successfully develop the new turbocharger with variable turbine geometry (VTG) for the start of production, Porsche Consulting took on the task of project organization.

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Porsche has always considered the 911 Turbo the ultimate in exclusivity and performance sport. Nothing has changed in this respect as far as the new model is concerned, but a lot has obviously changed in terms of its technology. In his capacity as the project manager responsible for the actuators of the 911, Thomas Krickelberg from Porsche AG, is convinced that: “The new 911 Turbo, like its predecessor, is both a technical flagship and a milestone.” The advantages of the new 911 Turbo, as is often the case with the 911 models, are firmly rooted in the rear end: two turbochargers featuring innovative variable turbine geometry (VTG) give the car its unbelievable power. The 480 bhp (353 kW) of the 3.6 liter power engine catapult the 911 Turbo zero to 100 in 3.9 seconds. However, even more impressive is the availability of the maximum torque. 620 Newton meters are fully available between 1,950 and 5,000 rpm.

This is largely thanks to the new turbocharger featuring VTG: eleven guide vanes, each about 21 millimeters long, seven millimeters wide, and formed with a slight blade profile, are set automatically by means of an electric motor so that optimum use can be made of the exhaust gas stream even at lower speeds. This technology, which has been used as standard in diesel engines for many years now, was previously deemed unviable for use in high performance power engines that only run on super unleaded fuel, due to the significantly increased level of stress under which it is placed. The exhaust gas can reach temperatures of up to 1,000 degrees—only very few materials can withstand that without damage, and they had previously been used mainly in the aerospace industry. A combination of materials was thus created that has to perform far beyond pure ultra-precision work, even at full constant load. A real master-piece. ▶



Completely unheard of: Specialist journalists saw the fascination of the new 911 Turbo for themselves in the Spanish province of Cadíz

In short: The turbo, which is out of this world, presented a major challenge. Krickelberg: “We soon realized that technical knowledge alone was not enough to solve this problem. Strict organization and optimum collaboration between all contractors and sub-contractors was needed. So we needed help from Porsche Consulting: An international player with technical know-how.”

As far as Cornelius Clauser and Sven Schärffe from Porsche Consulting, Porsche’s own consultancy firm, are concerned, the development phase was above all a

race against time. “You know the exact date on which production must start” says Cornelius Clauser, “and you already know from previous experience that with an innovation of this kind, problems that cost time will occur at some point during the development and testing phase. However, you don’t know in advance exactly when they will occur, or why.”

The new turbocharger is made up of fifty-seven components. Borg Warner Turbo Systems, based in Kirchheimbolanden, Germany, was Porsche’s main development

partner. The turbocharger supplier also assigned the development work to some thirty sub-contractors. Porsche Consulting was responsible for project organization. The interfaces and communications channels between supplier and Porsche were clearly defined. In addition, all involved had to create sufficient capacity for the development work. For that, it was necessary to select the sub-contractors to work on the later series at an early stage.

Besides scheduling and working towards deadlines, prioritizing the development areas currently being worked on was at the top of the agenda. In order to solve these problems promptly, Porsche Consulting set up a task force, to which all involved belonged, consisting of teams to address challenges and find solutions. “Porsche Consulting also gave us special access to the customer, and thus helped point out problems,” says Holger Gabriel, project manager at Borg Warner Turbo Systems. For him, the “intensity with which Porsche Consulting tackled the project”, was a completely new experience.

The involvement of the Porsche consultants lasted almost two years. Sven Schärffe summarizes this period as follows: “We got the right people in and ensured the success of the innovation process.” That called for technical understanding, and experience in organizing. “We were therefore able to discuss ideas with engineers on an equal footing, to assess the risks and to come up with successful solutions working in collaboration with the project team.”

During the last nine months before the start of production, representatives from Porsche AG, Borg Warner Turbo Systems and Porsche Consulting also had weekly meetings on set days to finalize all the details. This was a time that Thomas Krickelberg remembers with great respect: “It was a hard slog, but when I now see how enthusiastic the experts are about the new 911 Turbo, all I can say is that it was worth it.” ◀



Technological miracle: A cross-section of the new turbocharger