

Right-sizing

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08/09/2016 The traditional Porsche creed has always been about generating impressive power with comparatively small engines. Some call this form of clever efficiency “right-sizing," and there are plenty of examples of it to be found in Porsche's rich history.

More with less. When the little guy triumphs over the giants, he's bound to have the crowd on his side—one reason, undoubtedly, why Porsche has thrilled its fans from the outset. It all began with Sascha. Known to his friends by this affectionate form for Alexander in Russian, Count Alexander Kolowrat-Krakowsky not only played a pioneering role in developing the Austrian film industry, but also inspired a small race car built by Austro-Daimler in 1922. The car was named Sascha in honor of the count. The car was to be the highlight of Ferdinand Porsche's work as the head designer for Austro-Daimler in Austria.

Above all, the valve drive stood out as a masterpiece of technical prowess. Thanks to two overhead camshafts with vertical shaft control, the tiny four-cylinder generated a remarkable 45 hp with just over

a liter of displacement (1,089 cc). That power was enough to accelerate the car to over 140 kilometers per hour—an exceptional speed in the early 1920s. With its overall weight of less than 600 kilograms, the compact race car had an outstanding power-to-weight ratio. This made Sascha ideally suited to curvy races, such as the renowned Targa Florio in Sicily. Four Sascha cars from the Austro-Daimler factory team entered the race in 1922, and 432 kilometers later posted an exciting one-two finish in the 1.1-liter class. These highly efficient cars left half of the entire field in their dust, including race cars with over seven liters of displacement.

The Porsche developers utilized every trick in the engineering book

Porsche proved again in 1947 that powerful engine performance does not necessarily require a big engine. This time it was Ferry Porsche who accomplished new feats with the development of the Cisitalia 360, an elegant sports car that was built for an Italian businessman. And like the Sascha before it, the Cisitalia race car was far ahead of its time. Because the Grand Prix regulations restricted the displacement for supercharged engines to 1.5 liters, the Porsche developers utilized every trick in the engineering book. The result was a water-cooled, twelve-cylinder engine with a compressor whose four camshafts were, as in the Sascha, powered by vertical shafts. The 385 hp of engine power delivered at 10,600 rpm was distributed to all four drive wheels through a sequential transmission. With the 356 too, developed in parallel with the Cisitalia, Porsche continued to pursue the path of efficiency.

The first sports-car model line developed for Porsche itself was produced with a small 1.1-liter four-cylinder boxer engine from 1948 to 1954. Displacement was increased in small steps to 1,300 and 1,500 cc, and ultimately to 1,600 cc in 1955. Not least due to the efforts of dedicated private drivers, the Porsche 356 became the dominant vehicle of its era in the small-engine classes. Porsche itself entered the 24 Hours of Le Mans with a factory team for the first time in 1951. The 1,100 cc engine of the 356 SL (super light) put out just under 46 hp. Thanks to aerodynamic cladding and a long gear ratio, the Porsche 356 with starting number 46 posted a top speed of 160 km/h, and the racing world took notice. Against strong competition, the Gran Turismo from Zuffenhausen took the class victory and placed an impressive 20th in the overall classification, marking the first big international victory for the young Porsche brand.

First overall victory in the Targa Florio

Porsche introduced its first purebred racing machine in 1953: the 550 Spyder. Almost as celebrated as the vehicle itself was its drive unit, known as the Fuhrmann engine. For the 1.5-liter alloy four-cylinder, designer Ernst Fuhrmann tapped the full potential of modern racing engine engineering. Technical components such as the four overhead camshafts (with vertical shaft drive), dual ignition, a crankshaft with four sets of bearings, and eight-liter dry-sump lubrication added up to a robust 110 hp at 7,800 rpm. The exceptional potential of the engine was put on display at Le Mans in 1954 when a 550 Spyder reduced to 1,100 cc entered the race and took the class victory in the 1.1-liter class. In spite of ostensibly inferior power, the Porsche 550 and its successor, the Porsche 718, repeatedly snatched

victories from race cars with substantially larger engines, earning the Spyder the admiring moniker "Giant Killer." Porsche earned its first overall victory in a major international race in 1956 with the 550 A in the Targa Florio. The worldwide acclaim was all the greater, as it was the first time a small-class vehicle had prevailed in the Targa Florio over significantly more powerful competitors in the larger categories.

Throughout the 1960s, the small displacement classes were the undisputed domain of the Zuffenhausen-based brand. The 1.5-liter eight-cylinder boxer engine originally built for Formula One in 1962 was developed into a two-liter engine that would become the most successful racing engine of its time. Used in the types 904, 906, 907, 909, and 910, Porsche race cars in the two-liter sports-car class and hill-climb competitions proved all but invincible for several years. The Porsche 910 managed a legendary sweep of the top four places on the Nürburgring in 1967 against gigantic seven-liter models. This feat was followed in 1968 by a sweep of the podium by the 907 at the 24 Hours of Daytona. Beginning in 1966, Porsche claimed the European Hill Climb Championship four times in succession.

The 911 Carrera RSR Turbo started at Le Mans

Porsche's efficiency-first philosophy still reigned in the 1970s: in 1974, the 911 Carrera RSR Turbo started at Le Mans with a mere 2.1-liter engine. It placed second behind the Matra MS670, which was packing a three-liter, twelve-cylinder Formula One engine, and even managed to finish ahead of one of the Matras (third place). Fourth place was also taken by a purebred racing prototype, a Gulf Ford GR7. The small engine volume of the 911 RSR Turbo was the result of a handicap factor in the regulations for turbo engines, which restricted displacement to 2,142 cc.

Adding to a long list of successes, the Porsche 935/2.0 demonstrated in 1977 that it was possible to win races with a mere 1.4 liters of displacement. Empty, the car weighed only 710 kilograms thanks to its light aluminum tubular frame, which meant that it had to be loaded with lead weights to satisfy the minimum weight criteria for its class. In the rear of the race car, which was nicknamed "Baby," the turbocharged 1.4-liter six-cylinder engine could mobilize up to 380 hp. Though its premiere on the Norisring was a wash, in its second start—at Hockenheimring—driver Jacky Ickx blew away the competition and won the race by almost a minute. From there, the "Baby" rolled straight into the Porsche Museum, where it has stood ever since as a testament to the ability of the 935 to drive home Porsche victories in all displacement classes. Porsche introduced a true efficiency world champion in 1982 with the 956. With bi-turbocharging and digital engine electronics, the 620-hp 956 would become the most successful race car in history. The secret of its success lay in the perfect interaction of the aluminum monocoque, highly efficient 2.65-liter turbo engine, and revolutionary aerodynamics.

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Porsche's latest contribution to its peerless racing legacy is the 919 Hybrid. With its radical concept, Porsche once more pushes the envelope, designing every element with maximum efficiency in mind. Its hybrid system consists of a small-volume turbocharged V4 combustion engine, an electric motor on the front axle, and two energy recuperation systems. The Porsche name has been synonymous with racing success through technical prowess for nearly one hundred years. And with the 919 Hybrid, Porsche is keeping alive the proud tradition of intelligent performance through right-sizing.

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