



Press release
July 19, 2016

July milestone alarm:

Sixty years ago, Borgward designed a pioneering racecar engine that won the International Cup for F1 Manufacturers

- **1.5-liter engine with four-valve technology and direct injection**
- **Specific output rose to more than 100 hp per liter**
- **Borgward power enabled Cooper to win the International Cup for F1 Manufacturers in 1959**
- **Formula 1 driver Stirling Moss enthusiastic about the engine**

In the history of Borgward, the abbreviation 4 M 1.5 III RSE refers to a racecar engine that was first produced in 1956. Not only did it unite many pioneering design features, it also helped Cooper win the International Cup for Manufacturers with a racecar that was driven by Stirling Moss and others. The four-cylinder inline engine not only demonstrated Borgward's farsightedness, but also his innovative spirit. The engine was designed by Karl Ludwig Brandt, who was responsible for all of the racecar engines from the Bremen-based company.

The engine had a 1:10.5 compression ratio, which was unusually high for the time, and a displacement of 1.5 liters. To create this engine, the Borgward development department convincingly combined four-valve technology, gasoline direct injection, and dual camshafts with twin ignition and power transmission via double roller chains to create an engine that initially achieved the highly ambitious output of 134 hp, and later even 157 hp. Although no-one had expected it, the Bremen team had the complex technology under control from the start, and the new engine proved to be extremely reliable in motor sports. For his new racecar engine, Brandt decided to give the combustion chamber a gable shape as well as two ridge-mounted spark plugs one after another to make twin ignition possible. Between the two spark plugs was an injection nozzle surrounded by the four valves. This arrangement proved to be absolutely perfect.

The engine block was made of cast silumin and cleanly bolted together with studs and cap nuts. The crankshaft was supported in five bearings, the forged pistons moved with two compression and oil scraper rings in wet cylinder liners. The injection pump and the distributor were flanged to the rear part of the camshaft housing so that they could be driven by the camshafts. Brandt had created a drive train that, in 1956, put every other engine in this class in the shade.

The four-cylinder engine had its moment of truth during its first test rig run, where it initially only achieved 134 hp — far less than the 150 hp that the technician had too optimistically aimed for. However, the design spectacularly surpassed this threshold

three years later, when the engine's output rose to 157 hp. At that time, 100 hp per liter of displacement was a sensational value for a non-supercharged engine. Borgward steadily improved the racecar engine until its final use in 1959. Among other things, it replaced the forced-feed lubrication that was originally installed in the engine with a dry sump, which guaranteed optimal lubrication when taking curves at high speeds.

As early as the summer of 1956, the new engine demonstrated its high performance in the Borgward RS racing sports car. In its first test drive, the young racecar driver Helmut Schulze from Bremen reached a top speed of 247 kilometers per hour and the vehicle also passed a 20-hour endurance test with flying colors. The result of this tough testing was the 1.5-liter engine with strengthened connecting rods, pistons with reinforced bases, and improved cylinder liners. On July 3, Borgward and three drivers decided to conduct additional driving tests at the Nürburgring, the toughest and most demanding racetrack in Germany and still a venue for Formula 1 races today.

The Borgward RS had its racing debut at the winding Solitude racetrack in Stuttgart on July 22, 1956. Bremen plant driver Helmut Schulze took the vehicle, which was equipped with an engine that had just been taken off a test rig, to sixth place. Hans Herrmann, who later became the overall winner of the Le Mans race in a Porsche vehicle, came in second in the European drivers' championship in 1957, thanks to several good results with the engine used in the RS. During the 1958 season, it became increasingly clear that while the engine was superior to its rival from Zuffenhausen, the latter vehicle had a better chassis. Borgward came to the conclusion that the engine was faster than the car it was installed in. Swedish Formula 1 driver Joakim Bonnier nevertheless won the season's Schauinsland Race in a 1500 RS. The Schauinsland Race is held near Freiburg in the Black Forest and is one of the most demanding mountain runs in Germany. In reviewing the overall performance of the Bremen automaker's racecar engines during the season, Carl F. W. Borgward had a fundamental rethink of his company's involvement in motor sports, which he had initially given his wholehearted support. That's because the cars rarely won any races even though they were operated by highly talented drivers.

A farsighted man, Borgward made a strategic decision that would enable the engine to win the International Cup for F1 Manufacturers. The Bremen-based company contacted the British Racing Partnership (BRP) and eventually supplied the engines for the Formula racecars. The team's driver at the that time was British motor sports legend Stirling Moss, whose father founded the team to boost his son's career. In doing so, he cooperated closely with whisky tycoon Rob Walker, who helped fund the team.

The engine from Bremen greatly impressed Moss during his first test drives in a Cooper T45 open-wheel car for Formula 2. Moss was later to become runner-up in the Formula 1 world championship. The new engine was a major improvement over the former drive systems, especially with regard to drivability and output. Encouraged by these results, Rob Walker decided to put the open-wheel cars with the Borgward engine on the starting grid. Thanks to the Borgward power on the rear axle, Moss and his teammate Chris Bristow even scored enough points to win the 1959 International Cup for F1 Manufacturers. It left BRM, Lotus, and even Ferrari far behind, and Stirling Moss ranked third overall in the 1959 World Championship of Drivers.

It marked the baptism of fire of the 4 M 1.5 III RSE in Formula-class racing—the design from Borgward had demonstrated its superiority in the international arena. In 1959, Carl F. W. Borgward nevertheless withdrew from manufacturer-based motor sports, because he needed his experienced design and testing engineers to work instead on the development of the company's series-production vehicles.



After Borgward's bankruptcy, Kurt Kuhnke bought the entire motor sports department and wanted to use the enhanced engine in the 1961 Formula 1 season. The engine now achieved 172 hp at 7,300 rpm on the test rig of Kuhnke's Braunschweig-based racing team. The engine was used in several races that were not part of the Formula 1 World Championship.

Unfortunately, the four-cylinder was never used again in the top-of-the-line Formula 1 racing series. However, the technologically fascinating four-cylinder engine demonstrated the Borgward company's outstanding development capabilities and many of the racing engine's design features were incorporated into series-production cars. This was also the real—and the most important—reason why company founder Carl F. W. Borgward participated in motor sports. In one of his renowned technology dossiers, Gerd Hack from the magazine *auto, motor und sport* called the four-cylinder engine from Bremen "Borgward's outstanding racecar engine."

Captions:

Picture of Borgward racecar engine A:

The Borgward 4 M 1.5 III RSE racecar engine from 1956 united direct injection, twin ignition, and four-valve technology in a four-cylinder drive train.

Picture: Borgward racecar engine B:

Hans Herrmann behind the wheel of a Borgward 1500 RS during the 1958 German Grand Prix in the "carousel" on the legendary Nürburgring.

Further information

BORGWARD Group AG Marco Dalan
Kriegsbergstrasse 11 Head of Global Communications
70174 Stuttgart, Germany **Telephone** +49 711 365 10 1041

e-mail marco.dalan@borgward.com
www.borgward.com

