

## Aprilia Rsv Mille Technical Training Course

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Aprilia Consumer Service Spa  
Technical Service and Training  
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*RSV mille*

# RSV 1000 Technical Training Course

# RSV *Mille*



This material is didactic and  
may be changed following the technical  
development of the product

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## RSV 1000 INTRODUCTION



### Open your third eye !

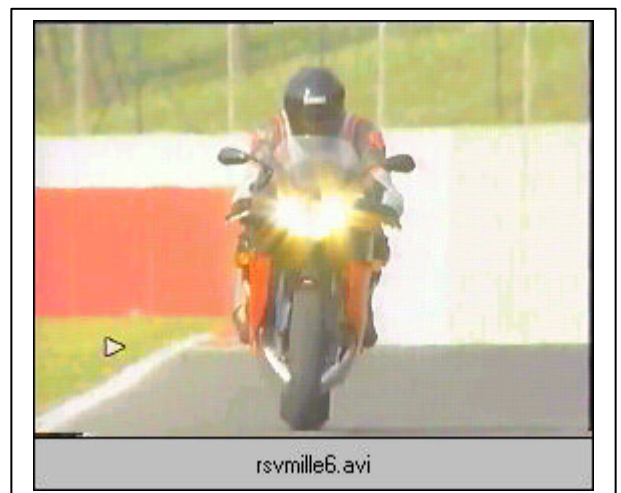
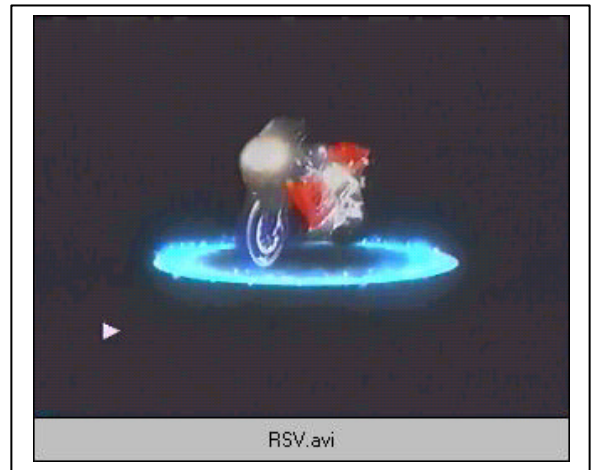
The originality of the technical decision the systematic use of solutions borrowed from the Racing Department and, above all, the passion and commitment applied to make every detail exclusive, form the basis of Aprilia's constructive philosophy. In particular, the **RSV Mille** embodies and enhances the most significant characteristics of this company's heritage, with its high-level technology, superior quality of construction and its unique and unmistakable design.

The **RSV Mille** brings a substantial change on the scene of high-powered super-sport motorcycles. Its manoeuvrability and easy riding - typical of two cylinder bikes - are wedded with the versatility and

The **RSV Mille** is the best production line bike for use on the track.

A bike that guarantees a pleasant ride, on either track or road, to satisfy even the most demanding rider who wants the best as regards easy bandling, performance, exclusive quality and technology. It is decidedly original, exclusive and performing. A motorcycle in which the love of the racing world is translated into a wealth of important details. A bike with a superior performance, occupying a price range in line with the best of Japanese competitors.

A product which represents, to all effects, a decision in style for the buyer and, for Aprilia, the first stage of further development linked with highpowered bikes. For Aprilia, "the sense of wonder" means breaking away from set patterns, having the courage to face new challenges, in this case shaking off a paradoxically conservatible universe such as the world of high-powered super-sports motorcycles. The **RSV Mille** marks a turning point, opens a new chapter and becomes the new point of reference

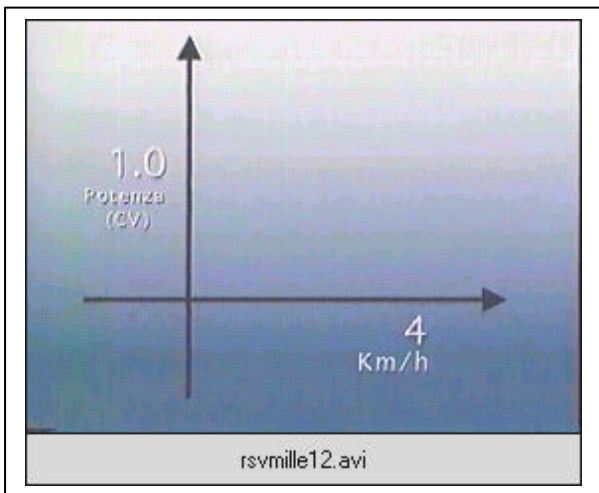
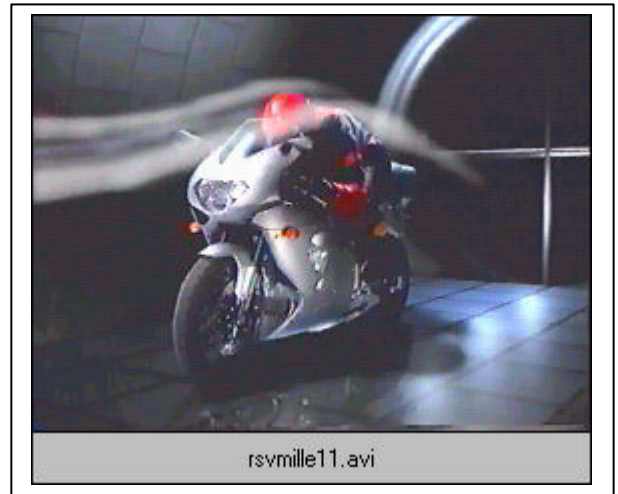


**Design Concept:**

Aprilia's aim in making RSV Mille was to create a motorcycle with extremely compact dimensions, one that could cleave the air in an optimum fashion and protect the rider against the impact of the wind and high speeds.

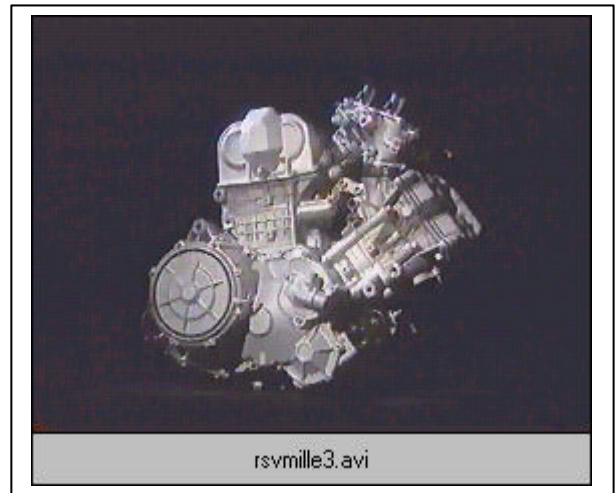
The flow inside the front air intakes has been optimized too, as well as the position of the intakes on the fairing.

As regards the aerodynamic result obtained, the achieved CXs value of 0,3010 is the new reference point for the category.



## THE ENGINE

The engine fitted on the **RSV Mille** is a completely new type, conceived and developed by Aprilia's engineers. It is a 60°V-formation longitudinal two cylinder engine, with 4 distribution valves per cylinder and a double camshaft at the head, controlled by a mixed chain and gear system. It is fed by electronic ignition with air input through a system of dynamic air intakes. Ignition is of the CDI type, where the load of air and petrol is fired by the TSI system (Twin Spark Ignition) which uses two spark plugs per cylinder. Ignition is controlled by the integrate engine management system, which also controls injection.



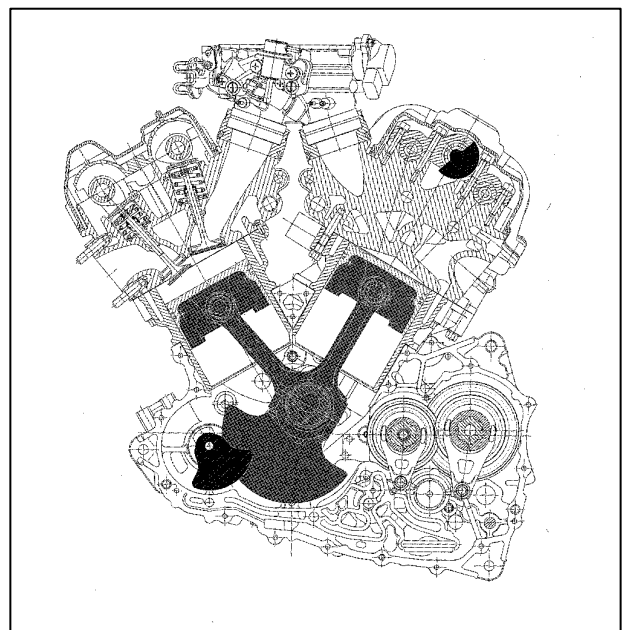
While it is true that the 90° V engine is intrinsically balanced (the first order forces generated during the movement of the internal organs automatically cancel one another), it is equally true that the dimension of the engine are penalized by the size of the angle between the cylinders.

The decision to use a 60° V-formation two-cylinder engine responds perfectly to the need for a lightweight, compact engine, so as not to sacrifice the design of the cycle parts with technical solutions and weight distribution that are not optimum.

### The countershafts

The problem of the vibrations which are created inside a 60° V engine gave the designers a lot of work. The possibility of offsetting the pins of the connecting rod was discarded, as it would have required excessive widening of the dimension of the motor crankcase.

The solution found was the use of the exclusive AVDC patent (Anti-Vibration Double Countershaft). This system uses an anti-vibration by turning countershaft which, in the opposite direction to the engine shaft, balances the first order forces. The moment generated by the countershaft is, in turn, balanced by fitting a second countershaft (Smaller than the main one) inside the head of the rear cylinder. The result of adopting this technology is an engine with excellent characteristics of power, torque, with extremely reduced vibrations.



## The dry sump

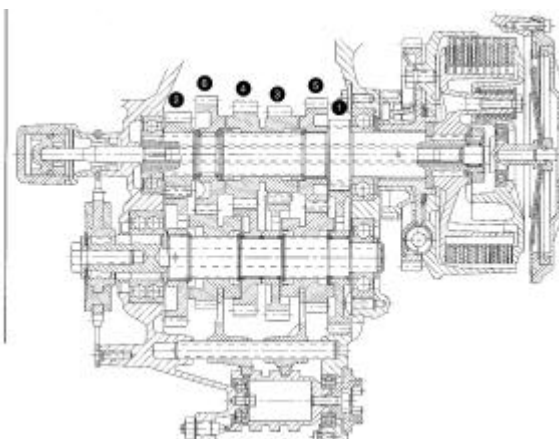
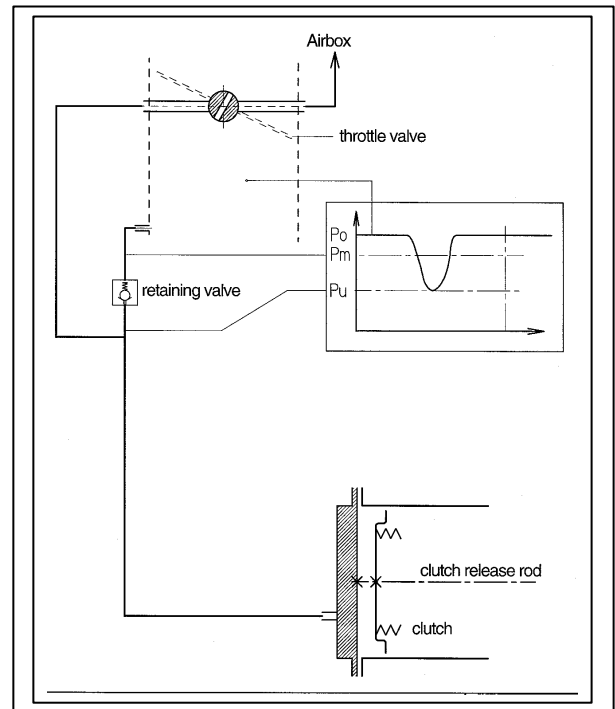
A further innovation brought by Aprilia in producing this new engine is the use of dry-sump lubrication, which allows a more rigid and compact engine block than the "wet-sump" solution. The system makes use of a second trochoid pump for recovery and an external oil tank, as well as a radiator positioned in front of the engine.

## The power clutch

The **RSV Mille** has a clutch with hydraulic control, assisted by the exclusive PPC patent (Pneumatic Power Clutch) to check bouncing of the rear wheel. When decelerating suddenly, the weight of the motorcycle is transferred instantly to the front, lightening the rear axle. In high-powered two-cylinder engines this phenomenon is accentuated by the high "engine braking" effect; this can cause the so-called bouncing, or the tendency of the rear wheel to block and lift off the ground, endangering the stability of the bike and, consequently, the vehicle's performance and safety.

Aprilia has found the ideal solution to this problem exploiting the variations in pressure which occur in the intake ducts when the throttle is opened and closed, to lighten the load on the clutch springs. By connecting the intake ducts to a "lung" situated at the side of the clutch group, the vacuum created when the throttle is closed decreases the load exerted on the disks by the springs, while when the throttle is opened again the clutch resumes operation under normal weight conditions, thus transferring all the power to the rear wheel.

This system also allows reduction of the force applied on the lever on the handlebar, when the bike is running at low rev speeds.

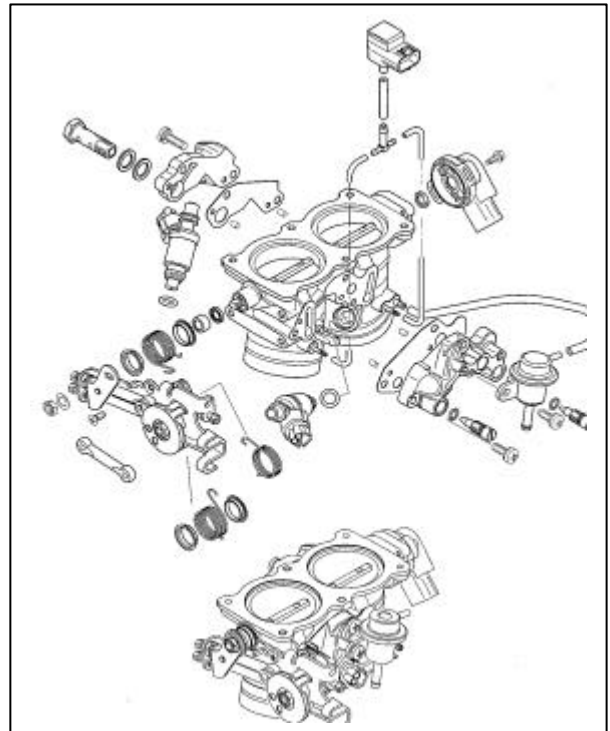


development of the product

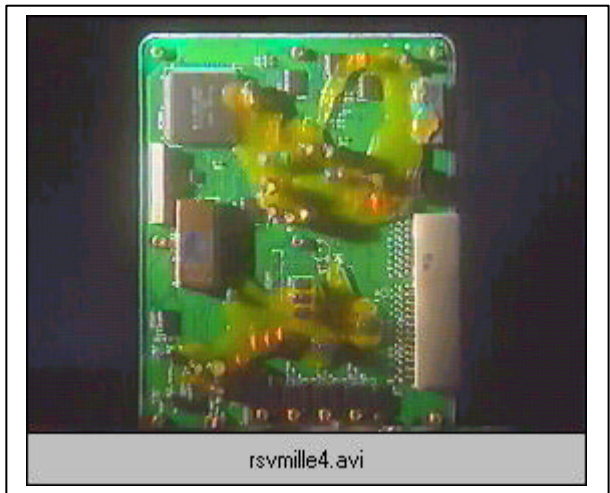
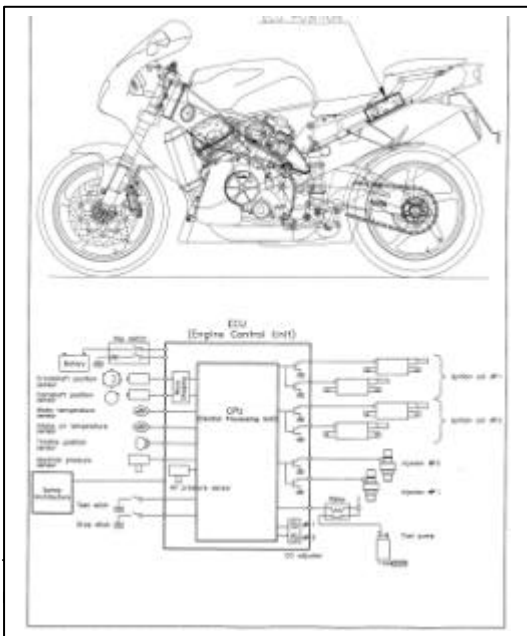
## Injection

The need for suitable control of the powerful engine of the **RSV Mille** led the Aprilia designers to adopt an electronic management system built into the engine. All the fundamental operating parameters are constantly monitored by a sophisticated electronic controls unit which, on the basis of the data received, control operation of both the injection system and the ignition system.

The injectors are fed by a pump which produces a constant pressure of 330 Kpa. The throttle bodies have a diameter of 51 mm. Fresh air is taken in through ducts which make use of dynamic pressure when the motor-cycle is moving, sending fresh air into a large volume airbox.



The entire injection/ignition system is also equipped with a continuous Selfdiagnosis circuit (both on starting and when the bike is running); this is able to indicate any malfunctions of the system directly on the dashboard, without the aid of complicated and expensive external equipment.



## The exhaust

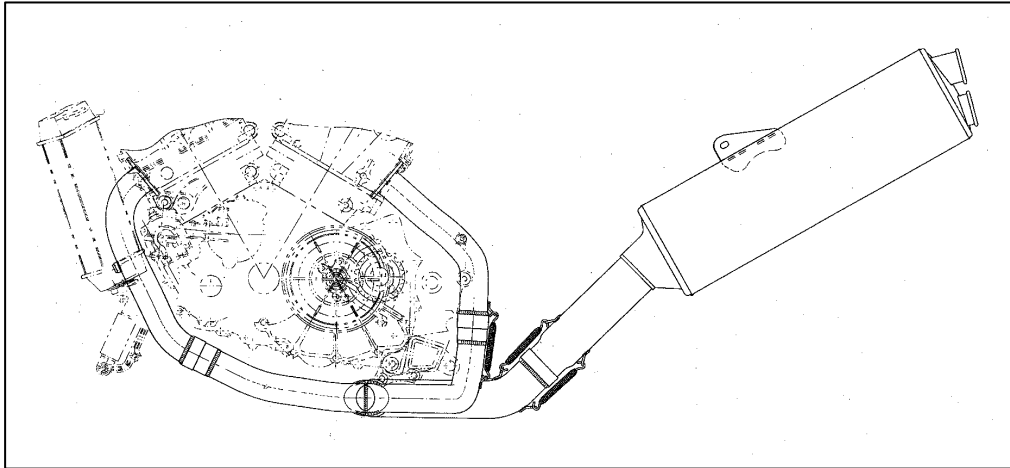
The exhaust system of the **RSV Mille** originates as the reply to four very precise requests: light weight, aerodynamic line, respect for the environment and for approval standards.

The choice of the "2 in 1" exhaust proved to be the most appropriate since, while obtaining an internal volume of over 9 litres, the bulk and weight are lower than those of a "2 in 2" exhaust.

The exhaust of the **RSV Mille** made completely of stainless steel, which ensures long life and lasting good looks.



As regards respect for the environment, the engine of the **RSV Mille** complies with the parameters of the future European standards (EURO 1, which comes into force in 1999); this result is achieved without the aid of any type of catalyst, as a further guarantee of performance and attention to these problems.





## CYCLE PARTS

Jewel within the jewel, the cycle parts of the **RSV Mille** must be considered to all effects a true masterpiece of engineering. As beautiful as a work of art, impeccably but above all efficiently finished, instinctive and easy to drive, to guarantee optimum exploitation of all the engine power.

The best engineers in the Aprilia racing department designed the frame, giving it the most in terms of planning and knowledge of structures, choice of materials, weight distribution and dynamic behaviour.

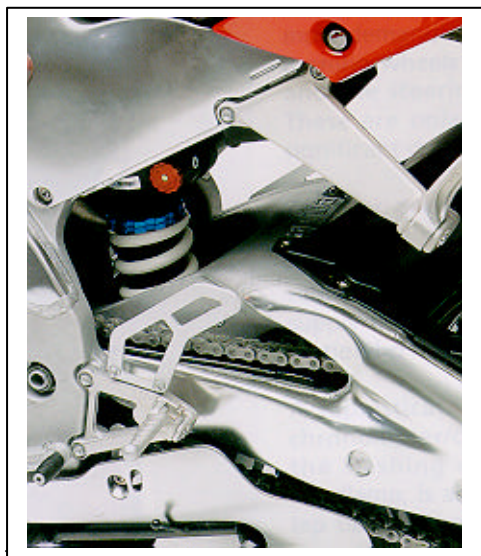


Particular care was taken with the torsional stiffness (with a record value of 650 Kgm) and bending resistance of the frame, fundamental elements as regards riding precision and safety.

The splendid rear fork with differentiated arms controls, by means of linkages, a multi-adjustable shock-absorber with built-in "piggy-back" tank. The rear wheel bump position is 135 mm.

At the front the 43 mm Showa "upside-down" fork allows a bump position of 120 mm.

The cycle parts of the **RSV Mille** are supported by a dry weight of only 189 kg, optimally distributed with 49.2% on the front axle and 50.8% on the rear axle.



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