Tumble flaps

In many Audi engines, both TDI and gasoline models, switchable swirl and tumble flaps are housed in the intake area. These flaps allow the intake air to be perfectly modulated for specific loads and engine speeds. This creates a swirling motion that improves the air-fuel mixture and enhances power and torque, while at the same time lowering fuel consumption and decreasing emissions. The flaps are driven with either electric or pneumatic power, depending on their design.

At idle, the flaps in the intake manifold are closed. When the driver accelerates at low engine speeds, the engine management initiates a partial opening of the flaps. This induces a specific tumble effect as the air enters the cylinder, allowing the combustion chambers to fill more efficiently and enhancing the combustion process. Above a certain load and engine speed, the flaps are fully open. They fit closely against the contour of the intake ports, thereby optimizing airflow and ensuring a good cylinder charge.

In the new 3.0 V6 TDI, Audi has replaced the individual flaps in the intake ports with a single flap at the entrance to the intake manifold. This new solution reduces intake losses and saves weight.

Status: 2011