

## INTAKE PORT FOR TURBOCHARGED SI ENGINE

HARISHCHANDRA JAGTAP, S. GOPINATH, VINAYAK CHAVAN  
AND RAVINDRA KOLI

### Abstract

For the modern high efficiency gasoline engine, optimization of the intake port shape for a four-valve engine is important in view with combustion development process. Swirl and tumble are two forms of rotating flow inside engine combustion chamber which can enhance the turbulence intensity during late compression, increase the turbulent flame speed, and hence accelerate the burning rate. The net effect of tumble on the thermal efficiency depends on several effects including tumble intensity, mixture strength, ignition source etc. Tumble can be an effective way to improve the thermal efficiency of SI engines. Gasoline turbocharged engine combustion system requires a high tumbling intake air flow with typical flow capacity. In current work, apart from only experimental approach; intake multivalve cylinder head was modeled by using three-dimensional computer software, flow visualization has been done using CFD tool and experiment has been performed with the cylinder head RPT followed by steady state flow measurement by LDA. The main task is to define a structured development process that enables a port design optimized for the combustion system requirements for the given boundary and packaging conditions for gasoline MPFI/DI engines.

---

**Keywords:** GDI, Intake port, Four-valve, Intake flow rate, Tumble ratio.