

Internal Combustion Engines

MIXTURE PREPERATION in SI ENGINES

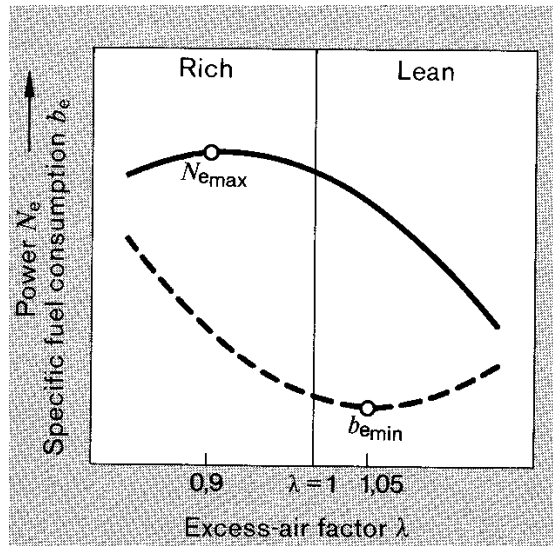
Prof.Dr. Cem Soruşbay

Internal Combustion Engines

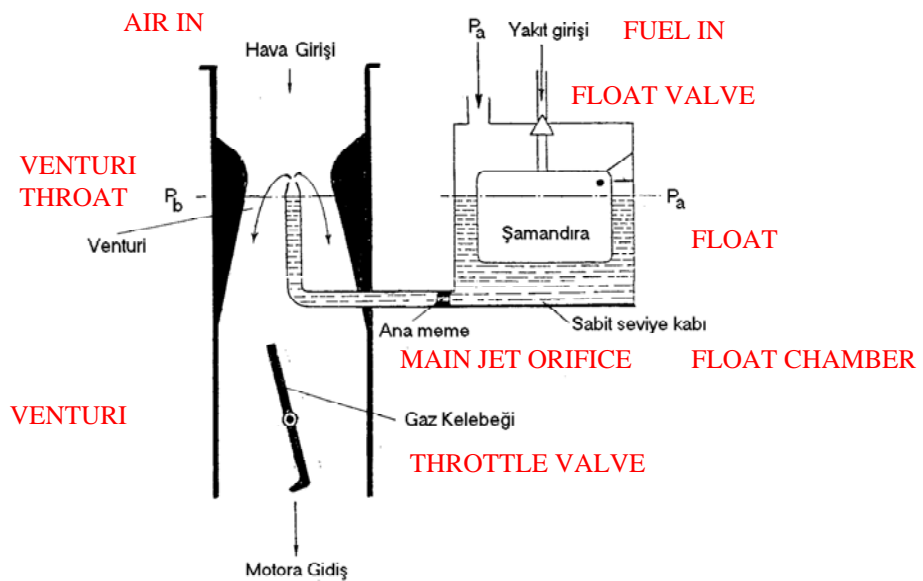
Mixture Preperation

- Introduction – engine performance and emissions
- Carburettors
- Fuel injection systems for gasoline engines

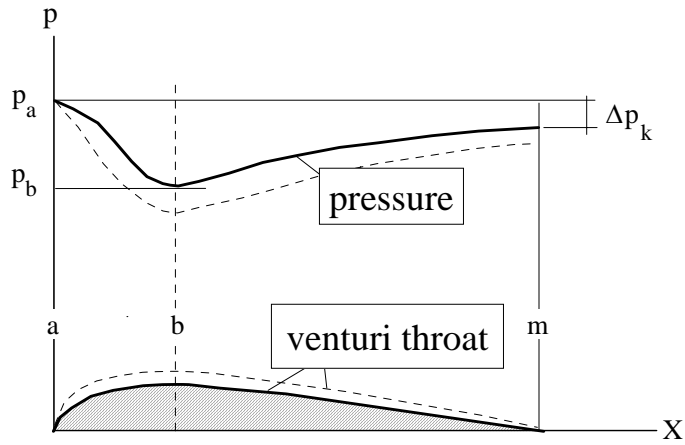
Spark Ignition Engines



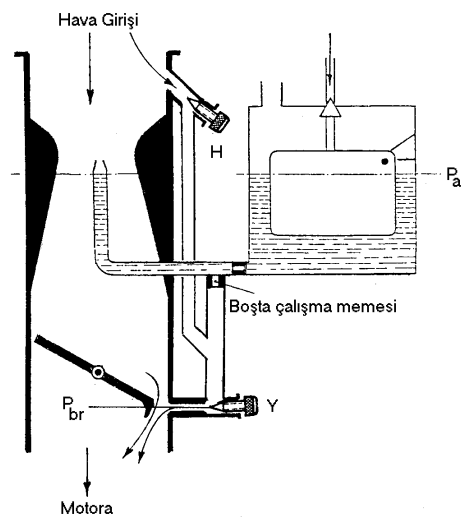
Simple Carburettor



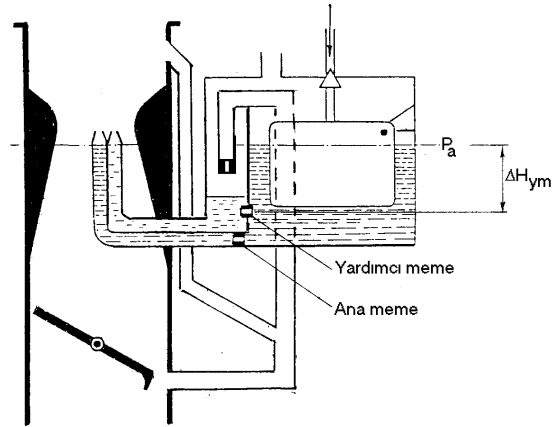
Simple Carburettor



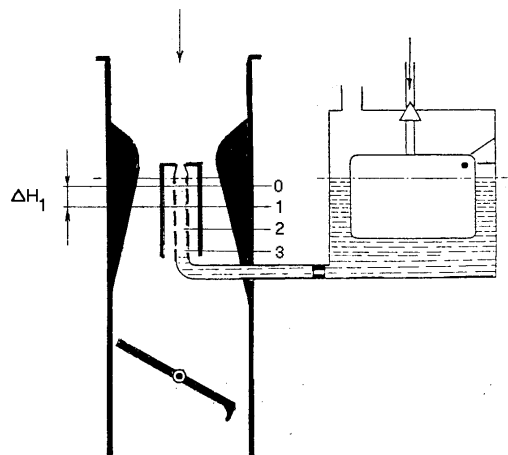
Idle Arrangement in a Carburettor



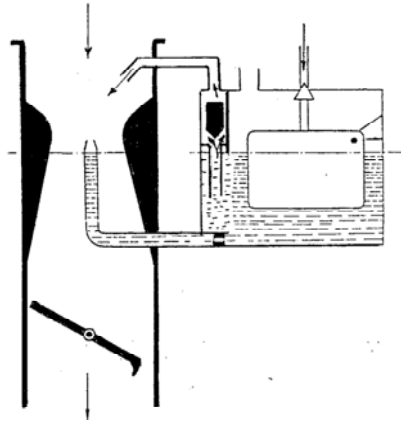
Zenith System – for fuel economy



Solex System – for fuel economy

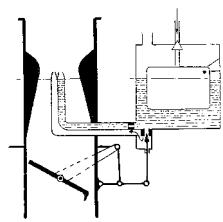


Mixture Enrichment – for high power operation

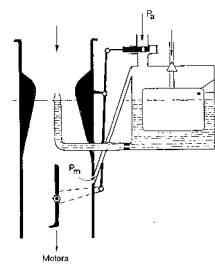


Mixture enrichment with intake manifold pressure control

Mixture Enrichment – for high power operation

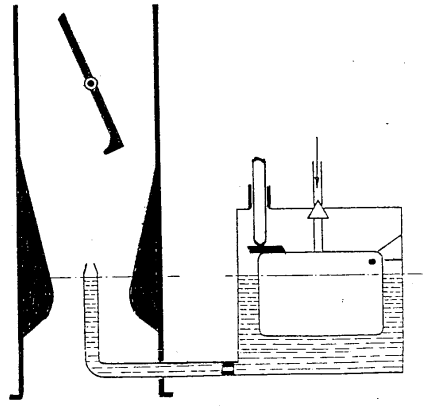


Mechanical system



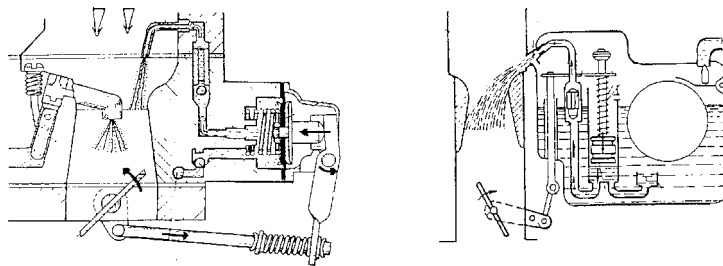
Float chamber pressure control

Start-up Mechanism



Enrichment by increase in fuel flow rate

Acceleration Mechanism



Mixture enrichment mechanisms

Fuel Injection

Classification of Gasoline Injection Systems

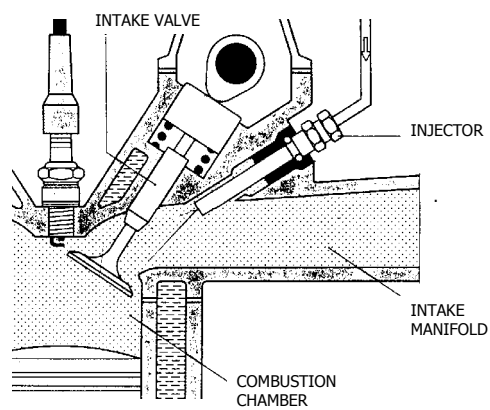
Location of injection :

intake manifold – single point injection, multi point injection
into the cylinder directly (GDI)

Timing of injection :

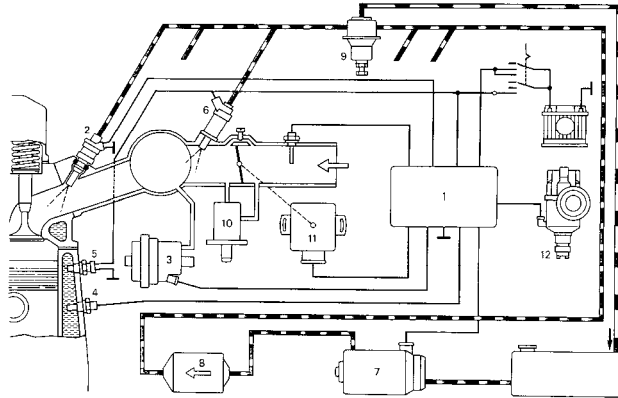
continuous injection
timed injection

Fuel Injection Systems



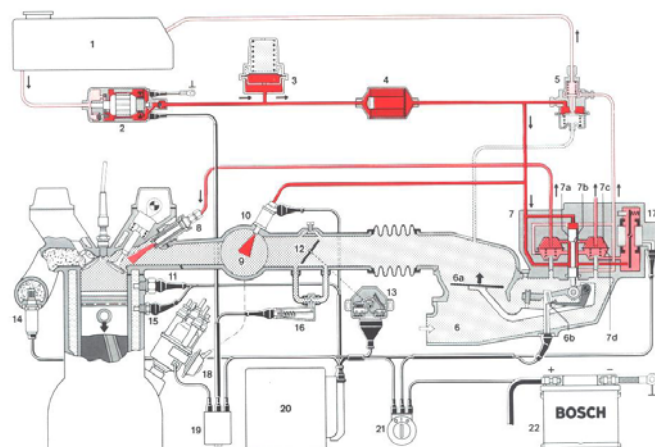
Fuel injection into the intake manifold

Gasoline Injection



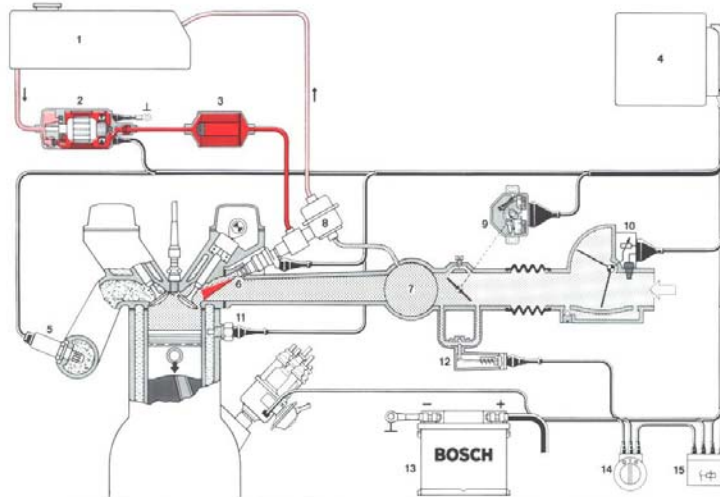
Bosch D-jetronic system

Gasoline Injection



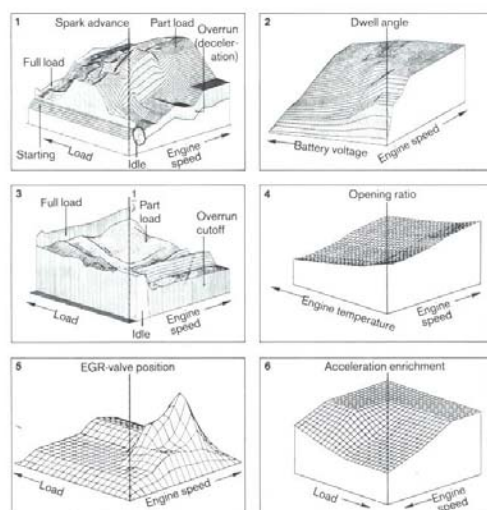
Bosch KE-jetronic system

Gasoline Injection

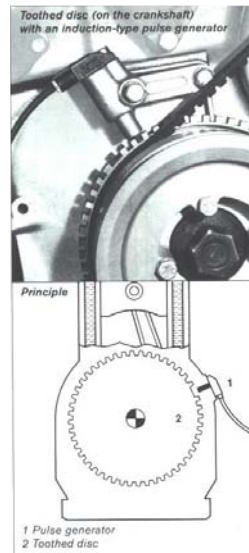


Bosch L-jetronic system

Control Mechanism – ignition, enrichment, EGR



Control Mechanism – engine r.p.m.



Fuel Injection

Classical (Conventional) SI engines;

Homogeneous charge combustion

Pre-mixed combustion – mixture is prepared outside the cylinder

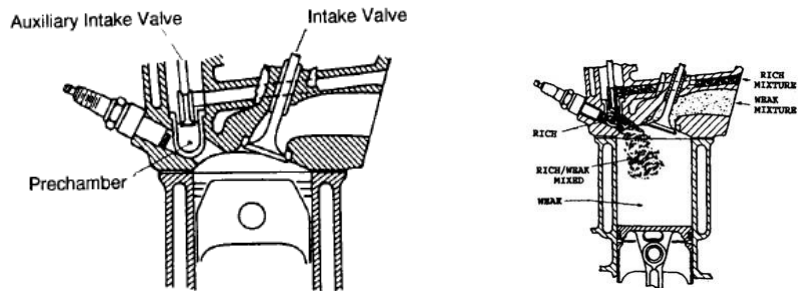
Gasoline Direct Injection systems;

Stratified charge (Kademeli dolgulu motorlar)

Lean operation at part load conditions

Mixture prepared in the cylinder during compression stroke

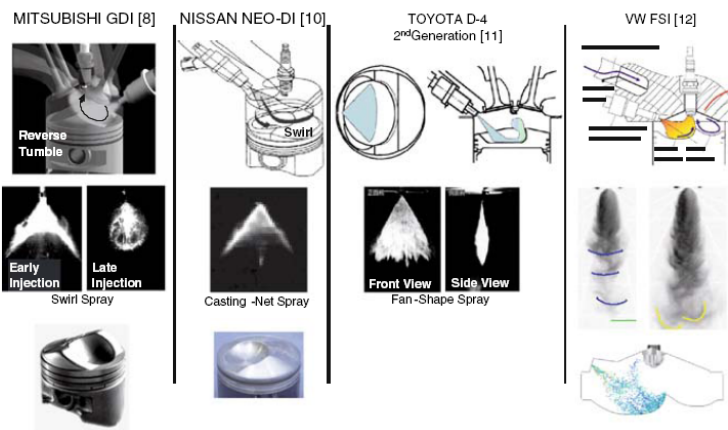
Honda CVCC System



Honda CIVIC ← CVCC : Compound Vortex Combustion Chamber

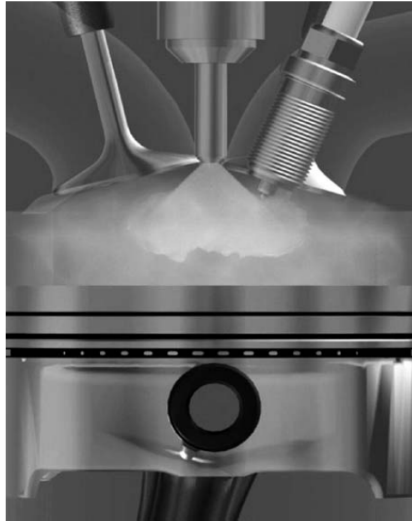
Stratified Charge Engine example

Wall-guided GDI Engines



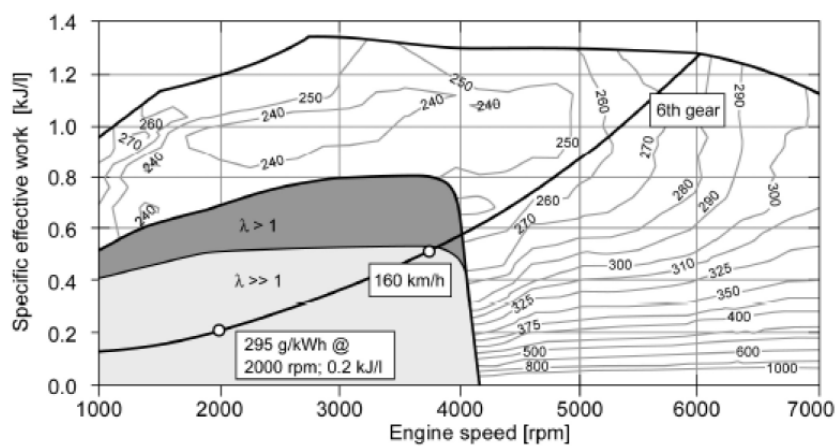
Direct injection examples

Spray-guided GDI Engines



Cylinder head configuration for spray-guided concept

BMW 3L I6 HPI Engine



Fuel Injection Systems

Gasoline Direct Injection

