



COMBUSTION MEASUREMENT TECHNOLOGIES

GASOLINE DI ENGINES

FUEL INJECTION FOR MINIMUM SOOT EMISSIONS

Evaluation of Mixture Formation Quality in Standard Engine Operation

Background:

Combustion of (stoichiometric) homogeneous charge in a spark ignited engine is governed by propagation of a turbulent flame front.

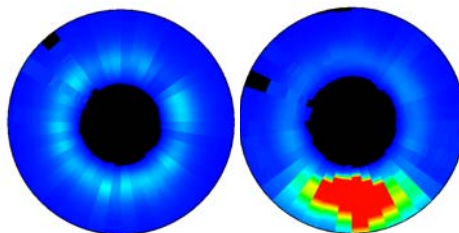
This yields a premixed flame, with flame radiation intensity rising and falling in accordance with the rate of heat release.

Deviations from this synchronicity are easily detected and are caused by imperfect mixture formation (fuel wall film, droplets not evaporated).

Applications:

Checking deviations from perfect premixed flame signatures show location and timing of diffusion flames. The task is to improve mixture formation until diffusion flames disappear.

perfect premixed
flame



local sooting diffusion flame in
otherwise premixed combustion

Benefits

- avoid or minimize sooting combustion in DI engines
- optimize fuel injection for premixed combustion under the guidance of „flame cycle pattern“ signals
- use procedure in stationary as well as in transient engine operation

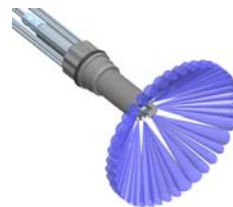
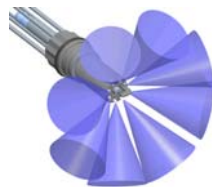
Methodology

- Visiolution spark plug sensors
- flame cycle pattern evaluation software license

Technical Data

- Visiolution spark plug sensor (8 to 40 optical channels) together with data recording system

8 channel sensor



40 channel sensor for high angular resolution

- Visiolution „flame cycle pattern“ analysis software
- spark plug sensors applicable in any type of engine configuration on test bed and on chassis dyno
- NA and TC engines

Project Packages

- spark plug sensor procurement: 2 weeks on stock, 8 weeks standard types, 10 weeks non standard types
- measurement packages: per week
- documentation and recommendations per measurement variant
- application package for Visiolution system users
- on site AVL measurement service supporting customer engine development projects