

Transonic Combustion™ - Injection Strategy Development for Supercritical Gasoline Injection-Ignition in a Light Duty Engine

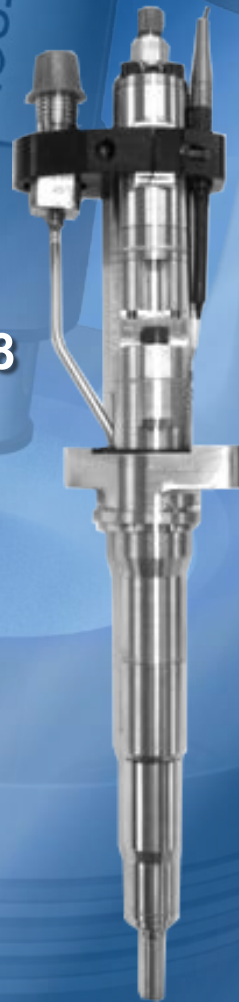
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Oct 16, 2012

Poster Location: P-08

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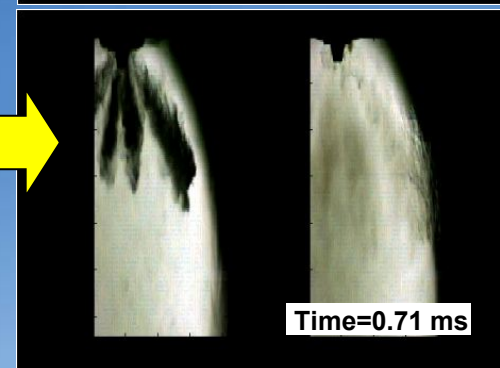
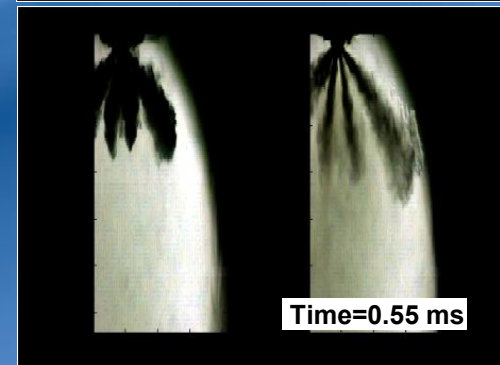
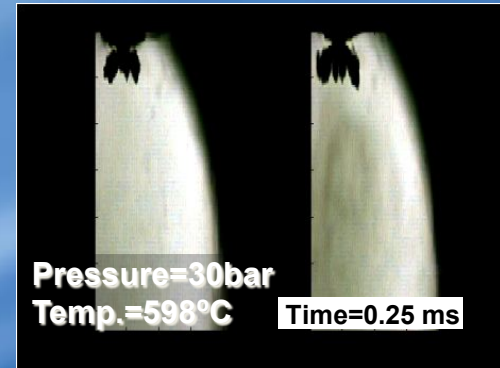
Supercritical Injection
• Pressure – 200 to 300 bar
• Temperature - 320°C



- **Rapid Mixture Formation**
- **High Mixture Temperature**



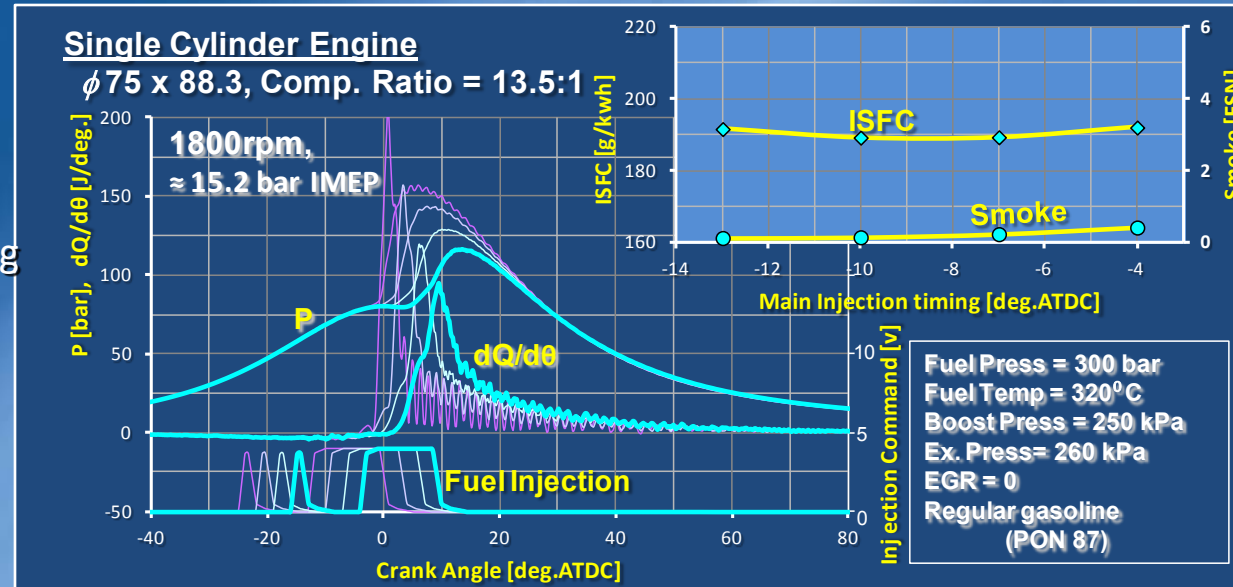
Liquid *Supercritical*



Knock Free Compression Ignition

POSTER LOCATION P-08

- CI+ diffusive combustion with late injection
- ↓
- Low combustion noise with pilot injection - $dP/d\theta < 8 \text{ bar/deg}$
- Low smoke with supercritical fuel - $< 0.4 \text{ FSN}$
- Low ISFC $\approx 190 \text{ g/kwh}$



Low Particulate Spark Ignition

- Supercritical fuel injection improves mixture formation for SIDI
- ↓
- Reduced PM and PN in direct injection homogeneous combustion
 - PM : up to 61%
 - PN : 47 to 98%
- Reduced engine-out HC and fuel consumption
 - HC : up to 45%
 - BSFC : up to 4%

