An Overview of Spray Testing Capability

1291-A Cumberland Avenue
West Lafayette, IN 47906

765-497-3269
765-463-7004

http://www.enurga.com
En’Urga provides spray characterization services for all types of injectors and nozzles using real world fluids. Details of our capabilities are highlighted in the following pages.
Spray Injection Capability

- Steady state and pulsed injectors for pressures up to 3,000 PSI – typically using pressure vessels and accumulators
- Transient pressure up to 8,000 PSI – hand pump used to test diesel injectors
- Fuel flow rate up to 500 kg/hr and air up to 100 kg/hr
- Real world or synthetic fuels – gasoline, diesel, JP-8, kerosene, heptane, furnace oil, Mil C-3024
- Different liquids – water, polymers, solids containing fluids, pharmaceuticals, etc.
- Effervescent atomizers

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Diagnostics Capability

- Spray patternation (SETScan optical patternator, En’Urga Inc.)
- Drop sizing – laser diffraction (Malvern)
- Drop sizing & velocity – PDA (Dantec)
- High speed spray imaging – 10,000 Hz (Quantum Tech.)
- Infrared spectrometry – 1,320 Hz (Spectraline Inc.)
- Visible spectrometry – 20 KHz (Spectraline Inc.)
- Mass flow measurements – gravimetric
- X-Ray tomography (dense sprays, windowless combustors, particulate filters, pharmaceutical powders, etc.)
- Correlation velocimetry (SCivel – En’Urga Inc.)
Spray Environment Capability

- Pressure rating –24 in Hg to 100 PSI
- 10 inch nominal ID
- 4 inch fused silica window on 2 sides
- Can be switched to sapphire for infrared diagnostics
- 34 inch high vessel to reduce spray bounce back
- Fully indexable injector mount
- Fitted with AP400 patternator
- Temperature controlled injection to 90°C
Pressure Vessel Test

Innovation in Quality Control
Resources

- Fully equipped combustion, optical diagnostics, and electronics laboratory
- Design software for mechanical, optical, and electronic components
- Access to the extensive laboratory facilities at Purdue University
- Fully developed supply chain for outsourcing
- Highly skilled technical staff
Sample Results

Injection pressure 10 MPa gage
Chamber pressure 40 Kpa absolute
Fuel temperature 90 °C
Quality Audit of Injectors

- SETscan patternator based quality audit of injectors
- 1000’s of nozzle per day
- Currently used for 100% testing in the Aerospace and Automotive industry
- Complete turn key solution with spray stand and equipment
- Contract quality audit for statistical quality assurance
- Highly repeatable and accurate results
- Address production processes as soon as it occurs

Innovation in Quality Control
## Partial list of customers

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