

Engine Emissions & Non-Exhaust Emission Instruments

Engine Exhaust Particle Sizer™ Spectrometer

Model 3090

The best tool for measuring transient particle emissions and characterizing exhaust after-treatment devices in real time.

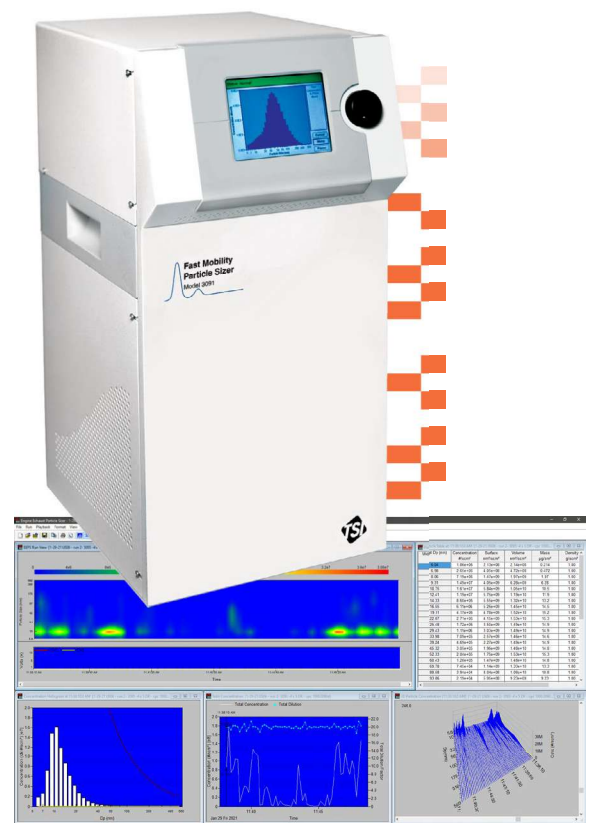
The Engine Exhaust Particle Sizer™ (EEPS™) spectrometer measures the size distribution of engine particle emissions in the range from 5.6 to 560 nm at 10 Hz. Users can visualize and study the dynamic behavior of emissions that occur during transient test cycles, such as changes in engine speed, or load. They may also measure emissions that occur during the first few seconds of a cold start or during regeneration of a particle trap or diesel particulate filter (DPF).

Measurements are displayed with high size resolution (32 total channels, 16 channels per decade of size). The EEPS™ spectrometer operates over a wide particle concentration range, which makes it well-suited for measuring upstream and downstream of a particle trap or DPF to determine soot loading and removal efficiency. The EEPS™ operates at ambient pressure to prevent evaporation of volatile and semivolatile particles, requires no consumables, and uses a pair of efficient, unipolar chargers to eliminate the need for a radioactive neutralizer. Users can select from multiple inversion matrices tailored to specific aerosols for more accurate measurements.

Like its sister instrument the Fast Mobility Particle Sizer (FMPS), the EEPS is a very easy-to-use device. All components, including the vacuum source, are housed in a single cabinet that weighs just 32 kg (~70 lbs). Just turn on the power and allow the instrument to warm up. An onboard Digital Signal Processor (DSP) inverts the raw data in real time to reduce data processing delays for faster results. The EEPS also features an external "start" input trigger for remote operation, two analog inputs to log and correlate other engine parameters, and four user-configurable analog outputs to integrate emission measurements with the test cell host computer.

The EEPS software allows users to display measurements in a variety of graphical and tabular formats, including 3-D viewing of size distribution and concentration versus time. These can be replayed for a unique "movie" view of the entire engine cycle, or you can zoom in on a period of interest. The software includes a data export capability and allows users to input individual effective densities per particle size channel to calculate a continuous output of total particulate mass.

The EEPS spectrometer was developed by TSI Incorporated under license from Airel, Ltd. of Tartu, Estonia. Additional assistance was provided by the University of Minnesota Center for Diesel Research.



Applications

- Gasoline Direct Injection Engine Emissions
- Diesel Exhaust
- Brake and Tire Emissions
- Cold Start
- Engine and After Treatment Development