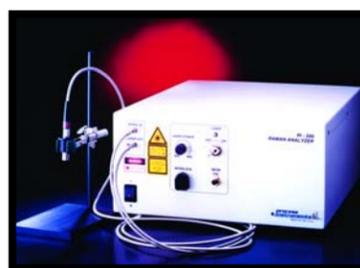




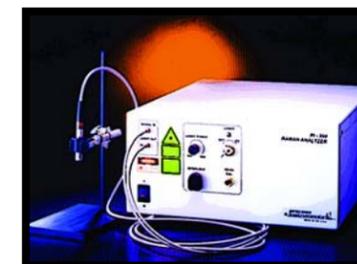
**A** petroleum company blends a variety of chemicals to produce different grades of gasoline. But to measure the makeup of each final product, samples must be taken and then transported from the field to the lab for detailed analysis—a process that can take up to eight hours, slowing gasoline production. Here is a product that performs real-time monitoring of chemicals.

PI-200

**How It Helps:** The PI-200 Raman Analyzer allows real-time analysis of chemical concentrations in sample streams, which can significantly improve quality control and process monitoring for industrial users. Compared with conventional equipment, the PI-200 is more rugged and can be used in many different industrial environments. Its compact design makes it suitable for field use, and the elimination of moving parts makes it low maintenance. Moreover, the analyzer's design can be used with any existing high-power diode laser, giving the system a large wavelength selection and, therefore, greater flexibility in detecting materials.



**How It Works:** The key to the PI-200 Raman Analyzer is an external-cavity-stabilized, narrow linewidth, near-infrared diode laser that offers high power and long life. In the analyzer, laser light is focused into an excitation fiber connected to a remote Raman sample cell. Inside the cell, the light interacts with the sample to be characterized. Raman scattered light emanating from the sample is guided down one or more collection fibers to the Raman spectrometer. The spectrometer passes the optical signal through a filter, an optical slit, and a diffraction grating. The signal is then transmitted to a charge-coupled device, which converts the optical signal into an electronic one. A computer analyzes the electronic signal and converts it into a graphical representation of the chemical analysis of the sample stream.



**How Much It Will Cost:** A laboratory version of the PI-200 costs about \$80,000, while a process control system using the device will cost more than \$120,000. A less sophisticated model for educational and quality control applications, called the PI-20, costs around \$33,000.

**When Will It Be Ready:** The analyzer is available now and can be purchased through six U.S. sales representatives as well as dealers in Europe and Japan.

**Who Is Working On It:** Process Instruments, Inc., developed the analyzer. Founded in 1994, the privately held company develops Raman spectroscopy instrumentation specifically for industrial process monitoring. Process Instruments currently employs eight people and occupies about 5,000 square feet of development and manufacturing space in Salt Lake City, Utah. For more information, contact Dr. Lee Smith of Process Instruments at (801) 322-1235 or lsmith@process-instruments-inc.com. The company Web site is [www.process-instruments-inc.com](http://www.process-instruments-inc.com).




**MDA Origins**

Process Instruments developed the PI-200 through BMDO SBIR Phase I and II contracts in 1998 and 1999. Raman spectroscopy instruments could prove valuable for quality control and process monitoring during the manufacture of key components for terrestrial and space-based ballistic missile systems. In 2001, BMDO awarded Process Instruments an SBIR Phase I contract to further develop its Raman spectroscopy system for testing the chemical state of new and aging rocket motors. Rapid, in situ determination of solid rocket propellant chemistry could greatly reduce the need for destructive testing.

