

SEMI-AUTOMATIC OCTANE ANALYZER LABORATORY SYSTEM



This fully automated analyzer is particularly suited for use in refineries or state, municipal, research & development or private, third party laboratories for octane number determination.

The Semi-Automatic Laboratory Octane Analyzer System is used in conjunction with your Waukesha CFR test engine. This laboratory system is particularly suited to refineries that are blending directly into holding tanks and taking samples from these tanks for analysis. Also suited for laboratory use (state, municipal, research & development, private third party, etc.) for octane number determination of fuel samples.

This system utilizes the Falling Level Method, Dynamic Level Method as described in ASTM D2699 and ASTM D2700. It includes six sample fuel bowls. With these, the operator will fill two of the bowls with primary reference fuels (PRF) two octane numbers apart. The remaining bowls are filled with up to four samples, all in the range between the two PRF fuels. The operator then starts the system and the fuels are automatically fed to the engine, in sequence, until the maximum knock intensity for each is determined. At this point, octane numbers are calculated and displayed.

If a two pass analysis is required, as per ASTM D2699 and ASTM D2700, the bowls can be automatically emptied but must be refilled manually, and the process repeated. The operator has the option to repeat, delete or add additional runs on any of the bowls.

This analyzer is based upon using a central computer to handle as many engines as are required. In order to run multiple engines, a multi-user operating system is supplied.

FEATURES INCLUDE:

General:

- Reduces octane giveaway that affects profitability.
- ASTM D2699 and ASTM 2700 compliant.
- Always finds correct fuel / air adjustment.
- Frees operator from continual fuel / air adjustment.
- Minimizes operator transcription errors (all data is handled by computer).
- Each engine has its own terminal from which the operator initiates sample analysis. Supervisory operations can also be performed from the engine terminals.
- Runs tests on multiple engines simultaneously. ESD has installed systems with up to 14 engines.
- 0.06 to 0.08 typical standard deviation.
- Includes automatic temperature control based on digital temperature input monitoring for air intake and mixture temperatures for all engines.
- No moving parts, increasing reliability.
- Minimal maintenance; can be accomplished by in-house personnel.
- Water cooled aluminum block brings fuel temperature down to ASTM requirements.
- Multiple product bowls with automatic sequencing via computer-controlled solenoids speeds up analysis and eliminates errors.
- Two bowls dedicated for reference fuels and four bowls are available for product samples.

- Bowls swing out of way quickly, giving access to the engine for maintenance.
- Top cover on bowl reduces evaporative losses.
- Delivers customized hardware and software.

Software & Programming:

- An interactive screen program through which the operator, at the engine, enters the information about the samples to be analyzed. All other factors are stored in the system and can only be changed under a supervisory menu. Examples: PRF octane numbers to be used, sample IDs. This reduces the probability that the operator will enter something in error.
- Application programs written in DecisionPlus and C++ to operate the system at each engine.
- A supervisory menu which lists the supervisory programs. These include, but are not limited to, features that are not normally available to the operator, such as viewing and editing historical octane rating result records, printing reports, viewing alarm logs, and performing system calibrations. The system keeps a complete history of all octane ratings that have been performed since installation.
- A continuously running scanner program to read and control all the analog and digital signals at high speed. A moving average is maintained on all variables resulting in precise, noise-free data acquisition.

FEATURES INCLUDE: (continued)

Hardware:

- Mounted at each engine is a stainless steel instrument cabinet with viewing window. This contains signal conditioner modules for knock signals, RTD temperature sensors and oil pressure.
- Includes UNIX-based system for high reliability, reduced costs and ease of expansion.
- 300 gigabyte RAID hard drives for program and data reliability.
- Color printer for reports.
- Uninterruptible power supply for entire system.

Engineering & Installation:

- Professional installation and startup will be performed by Electronic Systems Design field engineer(s). Optionally, a software engineer may also be on-site, if needed, during startup and commissioning. (This will be determined on a site-by-site basis.)
- Operator and supervisory training is included, which will be done during the installation phase. Our policy is to stay on-site until the project is complete and the customer is satisfied that all training has been done and everything is working properly. If there is a problem during the first twelve (12) months that your staff cannot resolve, we will make a return trip at no charge.

Comprehensive Report Generation:

- Measurement Results Report
 - Report may be optionally printed at the conclusion of each test
 - Historical reports of all ratings made by the system
- Summary Results Report (may be sorted by date or ID)
 - All tests performed over a given date range, including re-tests
- Detailed Summary Results Report (may be sorted by date or ID)
 - Same as above with additional details and measurement parameters
- Sensor Calibration and Alarm / Warning Limits Report

Engine Parameters:

ESD Octamatic Systems typically monitor the engine parameters shown below and are delivered with alarm and warning limits consistent with the relevant ASTM specifications. These limits are easily changeable by the customer.

- Engine coolant temperature
- Intake air temperature
- Mixture temperature (MON)
- Fuel refrigerant temperature
- Oil temperature
- Fuel temperature
- Knock intensity (K.I.)

Optional measurements that are often specified:

- Oil pressure
- Humidity
- Barometric pressure
- Oil pressure (switch)
- Water pressure (switch)
- Water level (switch)
- High coolant temperature (switch)
- Condenser temperature

Alarms & Warning Limits:

Alarms are considered more serious than warnings: the occurrence of an alarm required corrective action before measurements can continue. Warnings and alarms are displayed to the operator and must be cleared by the operator. In addition, some alarms act as a backup to the safety system provided by the engine manufacturer. The following engine conditions will trigger engine shutdown:

- Coolant temperature over 220° F.
- Oil pressure under 20 PSI
- Low oil pressure switch (optional)
- Low water pressure switch (optional)
- Low water level switch (optional)

Other warning conditions:

- Any temperature out of operating limits
- Out of fuel warning

Other alarm conditions:

- Oil pressure out of operating range
- No peak K.I. found after two attempts
- Product K.I. over 99 or under 10