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Herzog Cetane ID 510

Highest Precision in Determining Derived Cetane Number of Diesel Fuel Oils

- Increases refinery profits with perfect correlation to ASTM D613
- Significant savings on investment and maintenance
- Robust and fully automated technology for high ease of use
- Published in ASTM method D7668 as alternative to ASTM D613 / ISO 5165
- Officially approved in ASTM's diesel specifications: D975, D6751 and D7467

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WORLD-CLASS ANALYSIS OF DERIVED CETANE NUMBER FOR DIESEL FUELS

Accurate analysis of Derived Cetane Number (DCN) is an important tool for diesel and biodiesel fuel blenders and refineries to maintain fuel consistency and quality. Existing technologies such as CFR Engine and CVCC methods do not meet present market requirements with their high investment and operational cost, difficult operation and poor system performance. Herzog/PAC pioneered the Cetane ID 510 instrument: a unique technology that is proven to provide the best precision in the market for determining DCN of all types of Diesel Fuels, Biodiesel, FAME, HVO, BTL, and GTL. It is a compact, easy to use, and fully automated analyzer, that offers excellent return on investment, and is in compliance with today's safety requirements. The CID 510 patented method is approved as standard ASTM D7668 and officially approved in diesel specifications: ASTM D975, ASTM D6751 and ASTM D7467.

KEY ADVANTAGES

BEST PRECISION AND IN PERFECT CORRELATION TO ASTM D613

- Proven performance from ASTM/EI Inter Laboratory Study - included 20 samples*:
- Precision (r & R) exceeds CFR Engine and other CVCC instruments
- Cross Method Reproducibility (Rxy) is much better than other CVCC alternatives
- Excellent correlation of the Cetane ID 510 to the mean value of the CFR Engine
- Calibration is based on the same Primary Reference Fuels than CFR Engine ASTM D613
- Long term calibration stability, no frequent calibration is required

*13 distillate fuels, 2 blends of biodiesel in distillate fuel (B2-B7 and B20), 4 B-100 biodiesels (Soy, Canola, Tallow, and a 30/70 blend of soy and rapeseed, respectively), and 1 aviation turbine fuel

HIGH STANDARDS FOR SAFE OPERATION

- Built-in fire monitoring and suppression system
- Fuel level sensor to avoid the injection system from running dry
- Over pressure protection for fuel injection system
- Over pressure protection for combustion chamber
- CVCC heaters guarded by thermal fuse
- Coolant flow detection to protect fuel injection system and chamber pressure sensor
- Automated diagnostic functions —Leak test for combustion chamber

SIGNIFICANT SAVINGS ON INVESTMENT AND MAINTENANCE

- Requires much less valuable space than CFR Engine (no separate room necessary)
- Automated calibration for long-term stability minimizes down-time risks
- No special user training required
- Lower investment cost than alternatives
- No cleaning of test chamber required: sootless combustion eliminates cleaning of Fuel Injection System, Combustion Chamber & Pressure Sensor

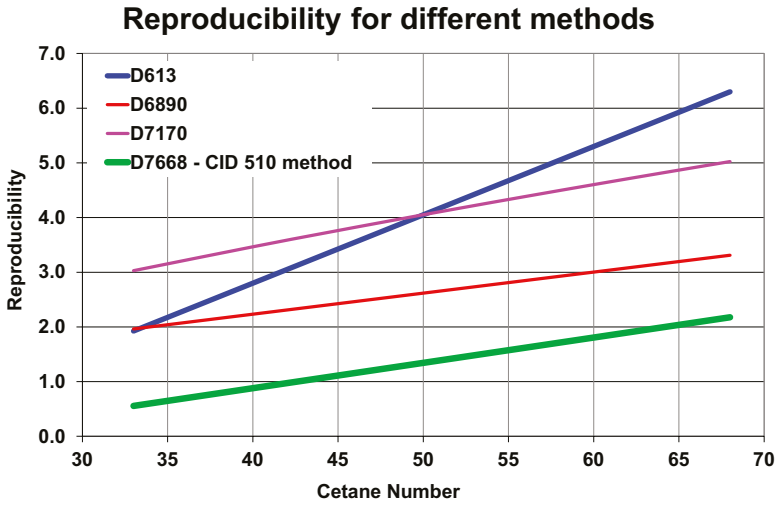
ROBUST AND FULLY AUTOMATED TECHNOLOGY FOR HIGH EASE OF USE

- Fully automated, one button operation allows minimal operator training
- Electronically controlled High Pressure Fuel Injection contributes to high accuracy
- Automatic Calibration with Primary Reference Fuels
- Automated diagnostic functions
- Flexible report formats for built-in printer and export to LIMS or Excel

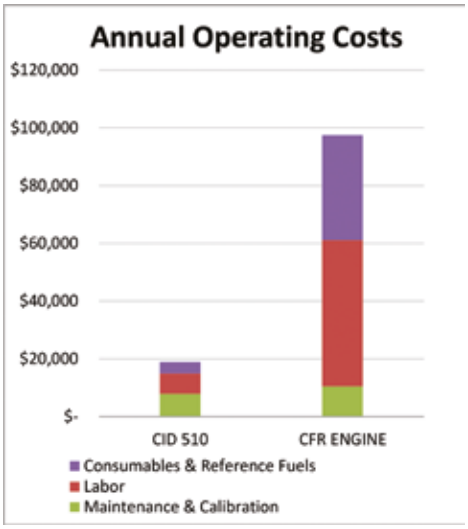
BEST ROI & PRECISION

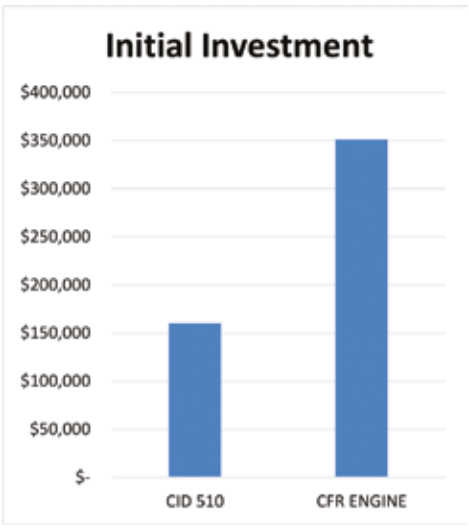
The CID 510 is proven to offer the best performance in the market. The excellent precision and correlation of this technology allows refineries to run their process closer to the specification limit for the cetane number. In addition the costs associated with cetane improvers is reduced, which ultimately increases a refinery's profitability.

The initial investment cost is less than half than the competition. With the CID 501 the cost for reference fuels, and the operator and maintenance cost can be reduced by 80%.



CID 510 has the best precision in the market.



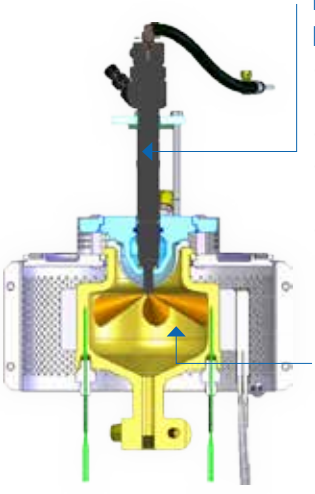


Costs for maintenance, calibration, labor and consumables for sample testing, plus the savings on the initial investment.

UNIQUE AND ADVANCED TECHNOLOGY FOR BEST PERFORMANCE

The fuel injection system is a modern high pressure common rail injection system which is electronically actuated offering ultimate precision. The common rail injector allows for much higher injection pressures (up to 1500 bar) yielding a completely volatilized test sample and therefore better, soot-free combustion than other Constant Volume Combustion Chamber (CVCC) instruments. The faster evaporation makes the pre-flame reactions observable.

The pre-flame clearly shows the effects of cetane improvers such as 2-ethylhyxylnitrate on the combustion process. The electronically controlled injector guarantees high precision in fuel injection volume making the results more repeatable.



Electronically Controlled Fuel Injection System

- Simulates real world Diesel engine systems
- Multiple nozzles
- Generates very fine droplet size
- Provides accurate injection volume

Heated Combustion Chamber

- Uniform fuel distribution
- Faster fuel evaporation
- Efficient mixing with air
- Sootless combustion

SPECIFICATIONS

Operation	
Combustion Chamber	Stainless Steel
Sample Introduction	Poured into sample vessel, then automatically pressurized by externally connected nitrogen supply
Sample Volume	60 - 160 ml for testing
Test Duration	30 minutes
Unit Warm Up	40 minutes
Range for Measured Derived Cetane Number	15 - 100 DCN
Cleansing	Using the following sample
Measurement Reports	
Operators	Up to 10 names of operators
Verification of test Conditions	Set-point and measurement conditions values stored in the instrument memory
Diagnostics and Calibration	Automatic Calibration Sequence. Error message and instrument test functions for easy unit diagnostics
Documentation	Detailed report of test results with the date and time of the measurement, database for storing results of the last 100 tests, result printed on built-in printer
External Connections	
Combustion Air	Compressed Synthetic Air, 19.5% to 20.5% O2; balance is N2 <0.003 Vol.% hydrocarbons and <0.025 vol.% water; Delivery Pressure 22 to 25 bar; Fitting 1/4A Swagelok for tube ID 6.4mm
Nitrogen	Compressed Nitrogen, 99.9% purity; Delivery Pressure 8 to 10 bar; Fitting 1/4A Swagelok for tube ID 6.4mm
External Cooling System	No-flow monitor locks the instrument if cooling system is not on.
Other Specifications	
Electrical Connection	115 or 230V, 50/60Hz with automatic switching over, input power of max. 3kW
Operating Requirements	Conditions Operating temperature: 10° to 35°C, recommended 15° to 25°C 80% relative humidity at 35°C
Methods	ASTM D7668, EN 16715, IP 615
Patents	European
Approved Specifications	ASTM D975, ASTM D6751, ASTM D7467
Size	WxHxD: 600mm x 660mm x 660mm (23.6'x 26.0"x 26.0")
Weight	Weight 80kg (177lbs)

Continuing research and development may result in specifications or appearance changes at any time

ABOUT PAC

PAC develops advanced instrumentation for lab and process applications based on strong **Analytical Expertise** that ensures **Optimal Performance** for our clients. Our analyzers help our clients meet complex industry challenges by providing a low cost of ownership, safe operation, high performance with fast, accurate, and actionable results, high uptime through reliable instrumentation, and compliance with standard methods.

Our solutions are from industry-leading brands: AC Analytical Controls, Advanced Sensors, Alcor, Antek, Herzog, ISL, Cambridge Viscosity, PSPI, and PetroSpec. We are committed to delivering superior and local customer service worldwide with 16 office locations and a network of over 50 distributors. PAC operates as a unit of Roper Technologies, Inc., a diversified technology company and a constituent of S&P 500, Fortune 1000, and Russell 1000 indices.

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