PAC solid partners proven solutions

Herzog Cetane ID 510

Highest Precision in Determining Derived Cetane Number of Diesel Fuel Oils

- Significant savings on investment and maintenance
- Robust and fully automated technology for high ease of use
- Approved standard methods: ASTM D7668, EN 16715 and IP 615
- Excellent correlation to ASTM D613, ISO 5165 & IP 41.
- Approved in diesel specifications: ASTM D975, D6751 and D7467, EN 590

Herzog Cetane ID 510

WORLD-CLASS ANALYSIS OF DERIVED CETANE NUMBER FOR DIESEL FUELS

Accurate analysis of Derived Cetane Number (DCN) is crucial 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 current market requirements with their high investment and operational cost, difficult operation and poor system performance. Herzog's Cetane ID 510 has 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, B100, Jet Fuel 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, EN 16715 and IP 615. It's also officially approved in diesel specifications: ASTM D975, D6751, D7467 and EN 590.

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

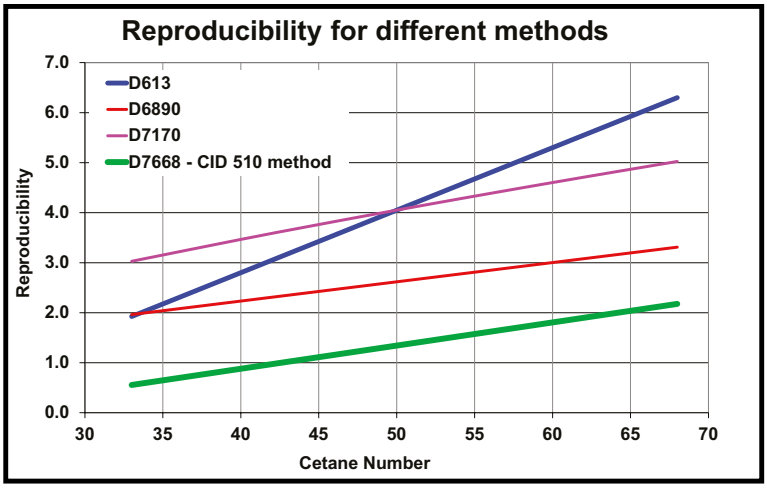
ROBUST AND FULLY AUTOMATED TECHNOLOGY FOR HIGH EASE OF USE

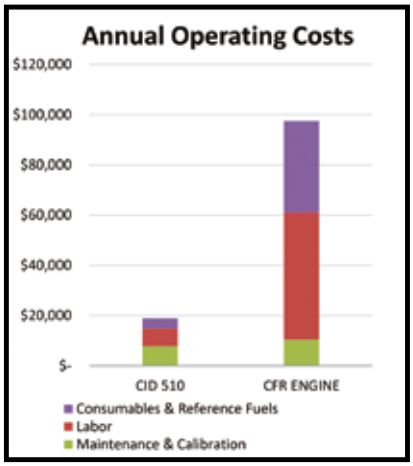
- Fully automated, one button operation allows minimal operator training
- Electronically controlled High Pressure Fuel Injection contributes to high accuracy
- Automatic Calibration with Primary Reference Fuels
- Automated diagnostic functions
- Flexible report formats for built-in printer and export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

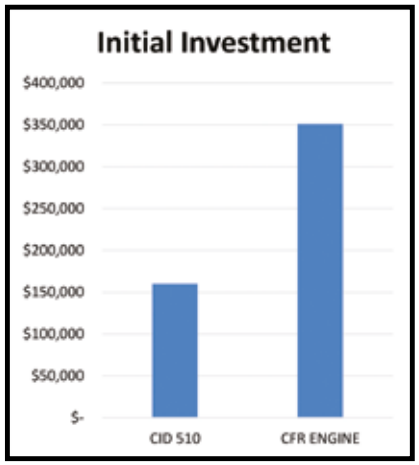
BEST ROI & PRECISION

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 510 the cost for reference fuels, and the operator and maintenance cost can be reduced by 80%.





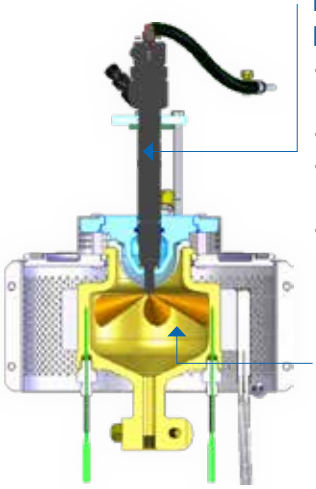


Costs for maintenance, calibration, labor and consumables for sample testing, plus the savings on the initial investment.

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		
Measurement Principle	Constant Volume Combustion Chamber (CVCC) with electronically controlled high pressure injector and patented Multi Point ID measurement	
Standard Test Methods	ASTM D7668, EN 16715, IP 615. Correlates to ASTM D613, ISO 5165, IP 41	
Fuel Specifications	ASTM D975, D7467, D6751, EN 590	
Precision	Published precision of the CID 510 ASTM D7668 is much better than the CFR Engine and other CVCC instruments. r = 0.6, R = 1.44 @ 52CN	
Operation		
User Interface	LC Display with solvent-proof numeric keypad with alpha numeric capabilities	
Combustion Chamber	6 mm stainless steel	
Injector	Modern high pressure common rail injector	
Sample Introduction	Sample is directly poured into the sample vessel	
Sample Volume	60 to 160 ml for testing (depending on number of tests) approx. 100 ml more for cleaning if done with next sample	
Timmings	Test Duration: Approx. 30 minutes	Warming up Time: Approx. 40 minutes
Measuring Range	15 - 100 DCN	
Cleaning	With next sample or appropiate solvent	
Unit Protection	Built in fire suppressing system with 2 fire sensors	
Software Functions	Result data base for the last 100 results. Print-out with built in printer. 10 Operator Names. Memory for Test Parameters. Automatic Calibration. Diagnostic Test.	
Computer interface	3 * USB for memory stick. RS232C serial port for LIMS and service. Ethernet RJ45 port for PC connection.	
Measurements		
Chamber	Temperature: Approx.600°C (adjustable 535°C to 650°C)	Pressure: 20 bar (adjustable 0 to 25 bar)
Injection	Time: 2500 µs (adjustable 400µs to 3000 µs)	Pressure: 1000 bar (adjustable 600 to 1400bar)
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	Liquid circulating bath: cooling power 260 W @ +50°C. Pump pressure 500mbar. Flow rate of 22 l/min No-flow monitor locks the instrument if cooling system is off.	
Other Specifications		
Electrical Connection	Dual Voltage 115 or 230V with automatic selection. Power 1800W.	
Operating Requirements	Temperature 10 to 35°C (50 to 95°F). Relative humidity up to 80% at 35°C (95°F).	
Size & Weight	W x H x D: 60 x 66x 66 cm (23.6x 26.0x 26.0 in.) 80 kg (177 lbs)	
Options & Accesories	External Cooler. Regulators for Nitrogen and Synthetic Air.	

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, Phase Technology, 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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