CFR IQT

IQT-XLM

Ignition Quality Tester

CFR Engines Canada ULC

Providing Value and Confidence in Global Fuel Quality

CFR® IQT®-XLM
Ignition Quality Tester

Providing value and confidence in ignition quality testing

Global diesel fuel standards recognize the CFR Ignition Quality Tester (IQT) for the determination and certification of the ignition quality of diesel fuel.

The IQT measures the ignition delay between fuel injection and combustion (like a cetane engine) without the use of a piston.

The testing process involves the injection of diesel fuel into a heated, Constant Volume Combustion Chamber (commonly called a CVCC). The resulting output is the generation of a Derived Cetane Number (DCN) that is used to certify to the cetane number specification of the standard.

The IQT is the only CVCC instrument that is a referee certification method for a fuel standard (the EN 15940 paraffinic diesel specification).

The CFR IQT-XLM is the next generation model of IQT. It provides the capabilities of the traditional IQT-LM and the IQT-TALM models (plus additional benefits) in a single compact, benchtop package.

The IQT-XLM conducts tests that are fully compliant with all procedures of the current IQT test methods.

The IQT®-XLM is the best choice for cetane determination with clean-burning, ultra-high cetane renewable diesel fuels.

The CFR IQT is the specified equipment for testing fuels according to:

ASTM® D6890: Standard Test Method for Determination of Ignition Delay and Derived Cetane Number (DCN) of Diesel Fuel Oils by Combustion in a Constant Volume Chamber

EN 15195: Liquid Petroleum Products – Determination of ignition delay and derived cetane number (DCN) of middle distillate fuels by combustion in a constant volume chamber

IP 498: Liquid Petroleum Products – Determination of ignition delay and derived cetane number (DCN) of middle distillate fuels by combustion in a constant volume chamber

Features & Benefits

Providing value and confidence in global fuel quality

The CFR IQT is the pioneer CVCC instrument for determining the ignition quality characteristics of motor fuels – whether diesel, fuel constituents or alternative fuels.

Future-proof your cetane measurement capabilities

The wide scope of the IQT test methods permits valid cetane reporting at the ultra-high cetane levels typical of next-generation renewable “green” diesel fuels.

A Proven Solution for Derived Cetane Number Certifications

The IQT is compact and low noise, making it suitable for installations in analytical laboratories close to other instruments. The automated test procedure requires minimal operator training. Automatic recording of all results, raw data, and test conditions ensures that compliance with all test method requirements is verified.

Suitable for a Wide Range of Diesel Applications

Applications include standard cetane diesel (ASTM D975, CAN/CGSB-3.517), European high cetane diesel (EN 590), California Air Resources Board (CARB) high cetane diesel, and U.S premium high cetane diesel. The IQT is listed as the referee test method for EN 15940, the European standard for ultra-high cetane diesel from synthesis or hydrotreatment (including renewable diesel from hydrotreated vegetable oil and gas-to-liquid fuels).

High Reliability and Up-Time

Since 1998, the IQT has become known for its reliability, ease of service, and durability. CFR Canada stocks all common parts/consumables, with over 98% of the IQT special parts available for immediate shipment. The IQT technical support team provides best-in-industry remote technical support in addition to on-site technical services.

Dependable Real-World Precision

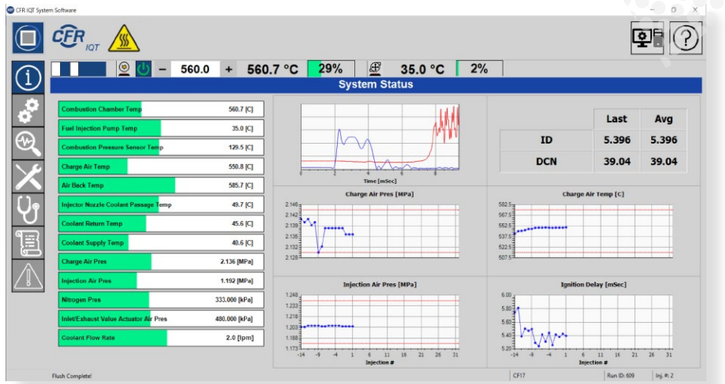
Users can trust IQT repeatability and reproducibility (r & R) values when applying statistical quality assurance and control charting techniques. The ASTM test method precision has been calculated using 7 years of real-world data from refineries and test laboratories during long-term, routine operation, using instruments up to 20 years old.

Cost Savings with Inexpensive Consumables

The IQT uses pure n-heptane as both a calibration reference material and a check standard. Users who have octane engines can use the same PRF-grade n-heptane in the IQT as they use for their engines. The compressed air requirements of the IQT can be met using inexpensive and easily sourced “off the shelf” cylinders of industrial dry compressed air.

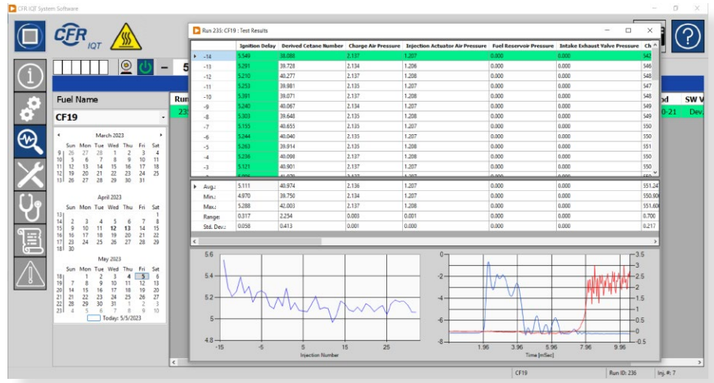
IQT®-XLM System Software

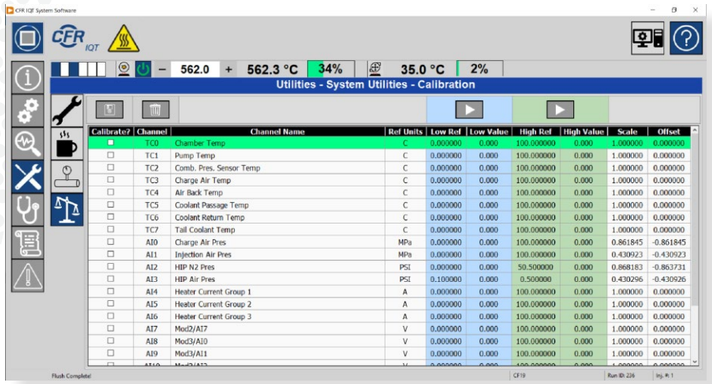
The IQT System's main operating screen clearly displays all operating parameters, using large color-coded bar graphs to indicate to the user whether a parameter is within allowable limits. The bar graphs are sized so that a basic check of the instrument's condition and test progress can be viewed from a distance.



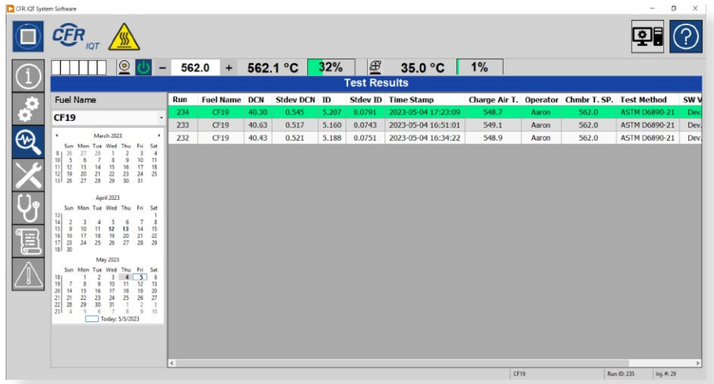
Assured Compliance with Test Method Requirements

A standard test report captures all critical test parameters, timestamps, raw ignition delay measurements, and a statistical analysis of those parameters. Validation of test results is performed automatically according to the requirements of the test method that the operator has selected. The complete test report is automatically saved as a PDF file.





Auxiliary screens allow the user to adjust test settings, view test results, calibrate sensors, and perform detailed diagnostic procedures. The screen example shown allows the operator to calibrate the instrument's temperature sensors.



The system automatically captures test data from runs conducted throughout each day. Data from each test is archived and presented in a daily run summary that can be exported to CSV format. Users can also use a convenient calendar selection tool to find past test results and reports.

The new IQT-XLM software features an intuitive and convenient user interface with:

- Simplified access to calibration and diagnostic functions
- Advanced diagnostics for condition-based maintenance
- Multiple language capabilities

Additional User Conveniences

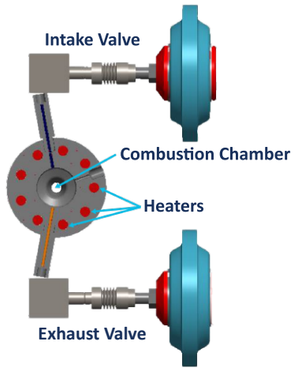
- Auto-prompt for fuel and operator name entry
- Automatically perform repeat testing of a fuel sample
- Integrated browser for previous test records, with full testing history stored in local database

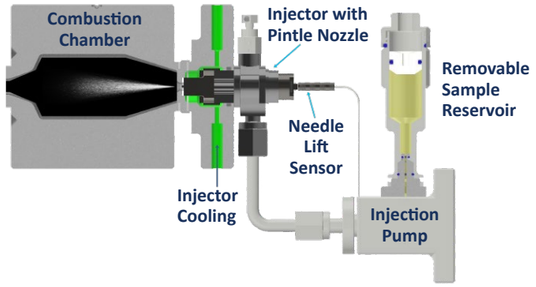
Trusted Design, Reliable Results

The IQT is the pioneer Constant Volume Combustion Chamber (CVCC) instrument, developed to measure the ignition quality of diesel fuel in a manner that correlates with the cetane number rating of the CFR F5 cetane engine. The core components of the IQT combustion analyzer were designed to provide engine-like fuel injection and ignition conditions in a compact instrument with low sample quantity requirements. With the addition of improved control systems and software, the IQT continues to provide class-leading precision and reliability.

Heated Combustion Chamber and Pneumatic Intake / Exhaust Valves

The heart of the IQT is its rugged, thick-walled, proprietary-designed combustion chamber. The combustion chamber is electrically heated and pressurized to provide a realistic diesel combustion environment. High force, pneumatically actuated intake and exhaust valves provide reliable flow in and out of the chamber despite the extreme temperature and pressure conditions.



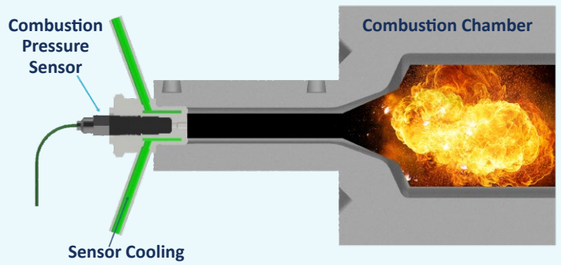


Fuel Injection System

Like an F5 cetane engine, the IQT uses a pintle-type injection nozzle that is equipped with a needle lift sensor to determine the start of injection. The fuel injection pump is driven by compressed air, and the patented design ensures that the amount of fuel injected and the spray produced is consistent every time the injection system fires. The fuel sample reservoir is removable, and self-sealing reservoirs can be cleaned and filled remotely in a fume hood.

Combustion Pressure Measurement

Once the fuel has been injected and ignites, the combustion pressure rise is measured using a liquid- cooled combustion pressure sensor and high-speed signal conditioning and data acquisition systems. This signal is used to determine the ignition delay (ID) value. The pressure sensor is extremely rugged and can last for the life of the instrument.



IQT® Software and Data Integrity

The IQT user interface simultaneously displays the needle lift and combustion pressure signals; along with ignition delay and Derived Cetane Number (DCN) results and all pressures and temperatures. Final results are recorded with the raw data and test condition compliance validations. The IQT® computer retains all test data recorded during the life of the instrument.

Configurations and Specifications

The IQT-XLM is offered as a single world-wide model that supersedes the earlier LM and TALM models and is suitable for both 50 Hz and 60 Hz electrical supplies. Automated control of injection nozzle and combustion sensor temperature (formerly requiring the TALM option) is now standard equipment.

The IQT-XLM is provided with either electronic or mechanical pressure regulation systems for compressed air and nitrogen. A wheeled instrument cart with an integrated pressure system is available. Additional options include a self-sealing sample reservoirs and remote filling/cleaning stations to permit sample handling in a fume hood.

Approved Reporting Range	31.5 to 75.1 DCN (working range of ASTM D6890 per ASTM D6300) 30.4 to 78.9 DCN (applicability of ASTM D6890 precision functions per ASTM D6300) 33.9 to 76.8 DCN (scope of EN 15195/IP498 per ISO 4259) 31.99 to 81.15 (range of valid results of EN 15195/IP498 per ISO 4259)
International Fuel Specifications / Types Approved for Cetane Measurement	ASTM D975 (petroleum diesel), ASTM D6751 (biodiesel), ASTM D7467 (petroleum diesel/biodiesel blends), CARB diesel, EN 590 (petroleum diesel), EN15940* (renewable diesel and GTL), ASTM D4054* (turbine fuel), MIL/DTL 83133K* (aviation kerosene) *test method to be used in case of dispute (referee method)
Warmup Time	Approximately 30 minutes to reach operating temperature from room temperature (Instrument may be left at operating temperature 24/7 if desired)
Test Time Per Sample	Approximately 17 minutes (includes 15 warmup injections and 32 injections for analysis)
Reported Test Result	Average ignition delay and DCN values of final 32 injections
Test Result Data Base	All test reports and sensor data recorded and stored during the lifetime of the instrument
Sample Volume	35 ml for cleaning, 30 ml for test run
Compressed Gas Requirements	Compressed air (19.9-21.9% O_2) at 21.7 bar (310 psi), compressed air at 12.1 bar (175 psi) Compressed nitrogen at 3.5 bar (50 psi) Complete gas pressure regulation system included with instrument
Reference Materials	n-heptane 99.5%, octane engine grade (calibration reference material, check standard) Methylcyclohexane 99% (verification material) Reference diesel fuel (quality control sample)
Test Sample Vessels	Removable stainless steel fuel reservoirs (26 ml, 55 ml, or 95 ml)
Electrical Connection	20A, 208-240 VAC, 50/60 Hz
Operating Conditions	Ambient temperature: 18 to 32° C, exhaust system ventilation: ~100 cfm
Size & Weight	66.8 cm (26.3 in) H x 118.1 cm (46.5 in) W x 56.4 cm (22.2 in) D, approximately 170 kg (375 lbs)

Scan to learn more about the IQT-XLM®

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