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## CFR-A1 Gasoline Octane Rating Machine ASTM D2699 & ASTM D2700

CFR-A1 Gasoline Octane Rating Units are used for determining and certifying the knock rating of automotive gasoline and liquid spark-ignition aviation fuels in terms of Motor octane number and Research octane number. The working range is from 40 to 120 octane number. The sample fuel is tested using a standardized single cylinder, four-stroke cycle, variable compression ratio, carbureted, CFR engine run in accordance with a defined set of operating conditions. Through the use of powerful software, high precision measurement and control components and the variety of functional external equipment, each operator can easily, accurately and efficiently complete a test. The unit can automatically display, save and print the test report.

Conforms to:

ASTM D2699: Standard Test Method for Research Octane Number of Spark-Ignition Engine Fuel

ASTM D2700: Standard Test Method for Motor Octane Number of Spark-Ignition Engine Fuel

GB/T 5487: Determination of the gasoline octane number-Test method for research octane number

GB/T 503: Determination of the gasoline octane number-Test method for motor octane number

### **Performance Characteristics:**

1. Integral cast iron cooling jacket conforming to CFR specifications, with the cylinder and cylinder head integrally casting.
2. CFR standard crankcase, with its 5 gears, 2 balance modules. The engine is mounted on the right side and the turning check system at the front.
3. Integrated cylinder, clamping sleeve, piston, carburetor components and other major mechanical components are designed and manufactured according to international standards.
4. Cost savings with one system flexibility, it can test both MON and RON and rapid switch between these two methods using combination pulley.
5. New size MIX heater, no need to disassemble for switching between MON and RON
6. Precise compression ratio test method with built-in working curve, more accurate test results.
7. With high accuracy sensor and integrated control module, the instrument can monitor various working conditions in real time, and give an alarm in abnormal situations.
8. Windows operation system, displaying the knock meter and knock signal.
9. Built-in automatic barometric pressure compensation module.
10. Automatic adjustment of CR with limit safety protection.
11. Ignition timing displayed automatically in real-time.

- 12.The vertical nozzle and the fourth carburetor bowl can be refrigerated,it can be applied to the test of light component oils.
- 13.The carburetor is equipped with 4 independent horizontal nozzles and one-way vertical nozzles, which can control fuel-air ratio accurately.
- 14.Automatic search the fuel level for maximum K.I., greatly simplify the maximum knock signal adjustment
- 15.Powerful dual-circulation air conditioner (ice tower) controls the IAT from 2°C to 4°C,effectively support the intake of large-bore engines.
- 16.Powerful upper exhaust cooled water circulator, water tank capacity  $\geq 60L$ ,cooled water outlet pressure : 0.2-0.4MPa,temperature range:15~25°C
- 17.Laser displacement sensor ensures no delay in adjustment and can provide limit safety protection.
- 18.High precision knock sensor with millisecond response.
- 19.Two-stage oil filtering and cooling function can effectively cool the lubricating oil and ensure long-term stable work.
- 20.Lubricating oil preheating function effectively shorten the warm up time.
- 21.Stainless steel cooling water tower can avoid corrosion of internal circulation channels and improve the cooling effect.
- 22.Phase protection device and emergency stop button can realize emergency protection under abnormal conditions.
- 23.High-capacity data storage and remote fault diagnosis function.
- 24.With safety warning and due maintenance reminder function.
- 25.Automatically record start-up time and accumulated test time.



### Technical Parameters:

No.	Tech Indicator	Description
1	Working Range	40~120 Octane Number
2	Cast Iron Cylinder Bore (Diameter)	82.55mm (3.250 Inch)
3	Piston Stroke	114.3mm (4.50 Inch)
4	Cylinder Displacement	0.61L (37.33 in3)
5	Compression Ratio Range	Adjustable 4:1 to 18:1
6	Engine Speed	900 rpm $\pm$ 9 rpm for Motor Method 600 rpm $\pm$ 6 rpm for Research Method
7	The clearance for both intake and exhaust valves (Engine running and hot)	0.20mm $\pm$ 0.025mm (0.008 in. $\pm$ 0.001 in.)
8	Spark Plug Gap	0.51 mm $\pm$ 0.13 mm (0.020 in. $\pm$ 0.005 in.)
9	Lubricating Oil Pressure	172kPa to 207kPa (25psi to 30psi)
10	Lubricating Oil Temperature	57°C $\pm$ 8°C (135°F $\pm$ 15°F)
11	Cylinder Jacket Coolant Temperature	100°C $\pm$ 1.5°C (212°F $\pm$ 3°F)
12	Intake Mixture Temperature (Motor Method)	149°C $\pm$ 1°C (300°F $\pm$ 2°F)
13	Intake Air Temperature (Motor Method)	38°C $\pm$ 2.8°C (100°F $\pm$ 5°F)
14	Intake Air Temperature (Research Method)	52°C $\pm$ 1°C (125°F $\pm$ 2°F) for operation at standard barometric pressure, maintained within $\pm$ 1°C ( $\pm$ 2°F) for other prevailing barometric pressure conditions.
15	Ignition Timing (Real-Time Displayed)	For Motor Method, 26° BTDC ( $\epsilon$ =5.0), adjusted automatically by the computer as CR changed For Research Method, Constant 13° BTDC
16	Electrical Specifications	AC 380V $\pm$ 10%, 50Hz; AC 220V $\pm$ 10%, 50Hz, Properly Grounded
17	Dimension of Machine	1650mm(W) $\times$ 900mm(D) $\times$ 1420mm(H)
18	Net Weight of Machine	1200kg