

# combination octane rating unit

## test method

This laboratory test method covers the quantitative determination of the knock rating of liquid spark-ignition engine fuel in terms of Research O.N. and the Motor Octane Number, including fuels that contain up to 25 % v/v of ethanol. The sample fuel is tested using a standardized single cylinder, four-stroke, variable compression ratio, carbureted, CFR engine run in accordance with a defined set of operating conditions.

The K90901 Standard Model Combination Octane Rating Unit is the latest model of octane engines with many easy to use features and enhanced documentation capabilities, conforming to the latest ASTM D2699 (RON) and ASTM D2700 (MON) Test Methods.

Through the engine's operating panel, the parameters are adjustable according to the ASTM D2699 and D2700 specifications. The professional and clear design of operating area makes the octane rating operation convenient and the data is easy to read and record. The auto-setting function of the octane engine effectively simplifies operational procedures and improves the efficiency of octane testing. The operating panel is equipped with a protect system and the push-button switches to avoid improper operation.

## feature & benefits

- Easy conversion between MON and RON methods is accomplished by use of the dual speed motor, with no need to change the flywheel.
- The dual speed motor with slide base steadily provides constant octane engine speeds as per ASTM D2699 and D2700 methods during operation.
- The engine crankcase is designed with high strength and rigidity for various fuel types to ensure long service life and carefree operation.
- The cylinder assembled allows the compression ratio to be changed by adjusting the cylinder height, which is adjusted by the electric motor assembly.
- The dial indicator is installed on the octane engine for direct reference to the cylinder height.
- The compression ratio and ignition timing are displayed directly on the operating panel, and displays the compensated reading for barometric pressure.
- With digital knock signal adjustment, combustion knock is converted into a stable and accurate analog signal to improve accuracy and efficiency.
- Through the engines safety system, the engine auto-stops with various fault indications.
- With the exhaust surge tank system, the engine eliminates resonance pulses and back pressure for more consistent and accurate results.
- The intake air humidity equipment regulates the moisture content of the intake air as per the ASTM specifications.

## functional information

Compression Ratio Display Device: Dial Indicator & Digital Counter  
Engine Speed Conversion: Dual-Speed Motor  
Carburetor: Four-Bowl Falling (with a cooling function)  
Ignition Timing Display: Digital (Auto-set)  
Crankcase Pressure Display: Yes  
Crankcase Oil Heater: Yes  
Oil Temperature Display: Yes  
Air Humidity Control Apparatus: Yes  
Unit Protection Systems: Yes



K90901 Combination  
Octane Rating Unit Engine

## specifications

Conforms to the specifications of: ASTM D2699 and ASTM D2700

Working Range: 40 – 120 Octane Number

Operation Conditions:

Cylinder Jacket Coolant Temperature:  $100^{\circ}\text{C} \pm 1.5^{\circ}\text{C}$  ( $212^{\circ}\text{F} \pm 3^{\circ}\text{F}$ )

Crankcase Oil Temperature:  $57^{\circ}\text{C} \pm 8.5^{\circ}\text{C}$  ( $135^{\circ}\text{F} \pm 15^{\circ}\text{F}$ )

MON Conditions

Engine Speed:  $900 \pm 9$  rpm

Ignition Timing: Variable as Cylinder Height is changed

Intake Air Temperature:  $38^{\circ}\text{C} \pm 1^{\circ}\text{C}$  ( $100^{\circ}\text{F} \pm 5^{\circ}\text{F}$ )

Intake Mixture Temperature:  $149^{\circ}\text{C} \pm 1^{\circ}\text{C}$  ( $300^{\circ}\text{F} \pm 2^{\circ}\text{F}$ )

RON Conditions

Engine Speed:  $600 \pm 6$  rpm

Ignition Timing:  $13^{\circ}$  BTDC

Intake Air Temperature:  $52^{\circ}\text{C} \pm 1^{\circ}\text{C}$  ( $125^{\circ}\text{F} \pm 2^{\circ}\text{F}$ )

Engine Information

Compression Ratio (C.R.): 4:1 – 18:1

Cylinder Bore (diameter): 82.55 mm (3.250")

Stroke: 114.30 mm (4.50")

Carburetor Venturi (Research): 14.30 mm (9/16")

Intake Valve Clearance (Hot):  $0.20 \text{ mm} \pm 0.025 \text{ mm}$  (0.008in.  $\pm 0.001$ in)

Exhaust Valve Clearance:  $0.20 \text{ mm} \pm 0.025 \text{ mm}$

Intake Valve Opens Timing:  $10^{\circ} \pm 2.5^{\circ}$  ATDC

Intake Valve Closes Timing:  $34^{\circ}$  ABDC

Exhaust Valve Opens Timing:  $40^{\circ}$  BBDC

Exhaust Valve Closes Timing:  $15^{\circ} \pm 2.5^{\circ}$  ATDC

Crankcase Oil Pressure: 172 kPa – 207 kPa (25psi to 30psi)

## ordering information

catalog no.	description
K90901	Combination Octane Rating Unit Engine
K90900-TK	Tool Kit to assist in the maintenance of the Octane Rating Unit
K90900-S	Spare Parts to Support the Combo Engine