PCS Instruments Automated BOCLE System (ABS)

Technical Specification

Standards Compliance

Fully complies with the requirements of ASTM D-5001, “Standard Test Method for Measurement of Lubricity of Aviation Turbine Fuels by the Ball-on-Cylinder Lubricity Evaluator (BOCLE)”

Fully Automatic Test Cycle Control

The PCS Instruments Automated BOCLE System (ABS) is the only fully automatic BOCLE tester currently available.
The complete test cycle is controlled by a built in microprocessor control system. The control system stabilises the fuel bath temperature, conditions the fuel for the required time then applies the load, times the test duration and removes the load at the end of the test.
No operator intervention is required other than to fit the test specimens and fill the fuel reservoir with test fuel. A single button press starts the test cycle. Fuel conditioning and test times are measured by reference to the microprocessor system clock.
Test parameters continuously shown on the LCD display throughout test cycle.

Fuel conditioning time	15 minutes, ±1 second max
Test duration	30 minutes, ±1 second max

Temperature Control

Temperature measurement is by a single DIN Class A platinum resistance sensor (Pt100). Heating/cooling is provided by a sealed, solid-state thermoelectric heat/cool element. Temperature control is by a heat/cool PID loop built in to the microprocessor system controller. The sensor can be calibrated by the user via the built in calibration routine in the instrument software.

Ambient temperature limits	+5.0 to +35.0°C
Fuel temperature control	25.0 ±0.5 max, ±0.1°C typical.

Conditioned Air Flow Control

Conditioned air temperature and relative humidity are measured with a high precision combined RH and temperature probe. Dry air is supplied from a compressed air cylinder and part of the flow is humidified in a water column. All flow rate adjustment is by two precision flow controllers which continuously adjust wet and dry air flow rates to give the correct humidity and overall flow rate. The flow controllers are driven by a PID loop built in to the microprocessor system controller.

Conditioned air control	Flow rate	3.8 ±0.05 litres/min
	RH	10.0 ±0.1% indicated
	Temperature	25.0 ±0.5 max, ±0.1°C typical.

Motor Speed Control

Motor speed is measured by a 1000 pulse/rev encoder on the motor shaft. Control is by a PID loop built in to the microprocessor system controller, referenced to the microprocessor system clock.

Motor speed	240.0 ±0.5 rpm

Fluid volume

The test fuel is contained in a simple to locate and remove polished stainless steel bath.

Fuel volume	50.0 ±0.5 ml

Loading system

The load is applied and removed at a controlled rate automatically during the test by an electro-mechanical actuator.

Applied load	1000g (500g weight)

Test specimens

Test rings are manufactured from SAE 8720 steel, hardness 58 to 62 Rc, surface finish Rq 0.51 to 0.71 micron.
Test ball are manufactured from AISI 52100 steel, hardness 64 to 66 Rc, diameter 12.7 mm (0.5 inch).

Services

Electrical	115 / 230V AC, 50/60 Hz, 500VA
Compressed air	4 litres/min compressed air at 1 to 2 bar (15 – 30 psi) inlet pressure. Air quality must meet requirements stated in ASTM D-5001 (British Oxygen Corporation BTCA 178 or equivalent)
Water	Air conditioning system requires 500ml de-ionised water fill after approximately 1200 test cycles.

Standards

Meets EU directive 89/336/EEC (electromagnetic compatibility) to standards EN50081-1 (radiated emissions) and EN50082-1 (interference immunity).

Meets EU directive 72/23/EWG (low voltage regulations) to standards EN61010-1 and EN61010-2-010.

CE Marked.

Physical

Dimensions	Single unit. 550W x 560D x 375H (mm)
Weight	20 kg.