

Metrology



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Metrology

Accurate calibration is an essential aspect for maintaining the integrity and quality of all breath alcohol testing instruments; calibration is especially critical when the devices are for law enforcement and evidential purposes. Law enforcement depends on the accuracy and reliability of breath alcohol results to ensure impaired driving offenders are removed from the road, therefore the highest quality and most accurate calibration equipment is necessary to ensure devices meet law enforcement standards.

Alcohol Countermeasure Systems offers a variety of options to meet the specific requirements of calibration laboratories.

ALCOSIM™



Easy and accurate calibration

ALCOSIM is a breath alcohol simulator suitable for trained technicians and makes calibrating and verifying breath alcohol testing instruments a quick and easy process. Using certified alcohol reference solution (ARS), ALCOSIM produces an air sample with an ethanol concentration equivalent to the calibration set point of the breath alcohol testing instrument.

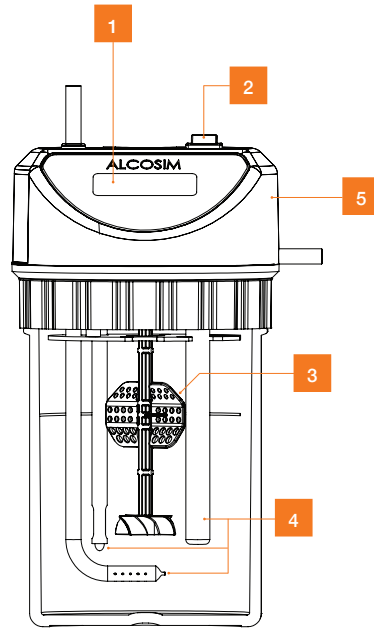
ALCOSIM heats and maintains the reference solution to 34 ± 0.02 °C to simulate the density, composition and temperature of a human breath sample. The stirrer ensures the temperature remains constant and heat is evenly distributed.

Once ALCOSIM is at operating temperature, simply breathe into the inlet hose to produce an air-alcohol sample. The breath alcohol testing instrument compares this sample to the value of the chosen reference solution.

The medical grade plastic solution container is durable to prevent breakage and heat resistant to prevent burns. The stainless steel heating element, dual temperature sensors, stirrer and tubing resists corrosion, rust and heat damage. The wide angle LCD display indicates the temperature to two decimal places.

Components

1. LCD display shows temperature.
2. Green light indicates when ALCOSIM is ready.
3. Stirrer ensures temperature remains constant and heat is evenly distributed.
4. Stainless steel heating elements withstands corrosion and heats alcohol reference solution quickly.
5. Heat resistant and durable medical grade plastic prevents breakage and burns.



Benefits

Quick warm-up and calibration process.

Simulates the density and composition of a human breath sample.

Alcohol reference solution is maintained at 34 ± 0.02 °C to replicate the temperature of human breath.

Manufactured using high quality materials resistant to rust, corrosion and breakage.

ALCOSIM™ Calibration Bench



Calibration technology designed for efficiency

The ALCOSIM Calibration Bench enhances the performance of ALCOSIM breath alcohol simulators, providing more precise temperature and sample pressure / flow control while accommodating a range of thresholds and multiple devices.

The ALCOSIM Calibration Bench is used to calibrate hand-held breath alcohol testers, including passive and screening instruments. The ALCOSIM Calibration Bench provides a six simulator setup for three separate concentration set points, has a solid body and adjustable platform, and provides a fast and reliable calibration process.

Each ALCOSIM breath alcohol simulator uses a closed loop temperature control system that generates breath flow to provide a precise calibration standard. The simulator uses alcohol reference solution, available in a wide range of concentrations to suit varying operational needs. To accurately simulate human breath, the temperature of the alcohol reference solution is maintained at a constant 34 ± 0.02 °C within the simulator solution container.

Benefits

Optimizes gas flow and alcohol reference solution, generating 100 simulated breath samples per litre of reference solution.

Eliminates human error and provides consistent simulated breath samples.

Efficient and adjustable test platform accommodates a variety of breath alcohol testers and can calibrate multiple devices simultaneously.

Customize the breath sample pressure, duration of the process and reference solution concentration to meet specific calibration requirements.

Features

- LED indicator displays the duration of the sample in seconds
- Easy operation using conveniently located dials with options clearly displayed
- Six ALCOSIM setup - with ease of alcohol reference solution addition and removal
- Adjustable platform allows calibration of up to three breath alcohol testing devices simultaneously



Metrological Test Bench

Service, calibrate and certify evidential devices

The Metrological Test Bench is a multifaceted, multi-functional and highly customizable human breath alcohol simulator ideal for ISO 17025 calibration laboratories and performing OIML R 126 1998 and 2012 test protocols.

The Metrological Test Bench is designed to accommodate a variety of sensors, ethylometers and breath alcohol testing equipment, for both evidential and screening purposes. The Metrological Test Bench replicates the composition, temperature, volume and pressure of human breath needed to service, calibrate and certify alcohol testing products.

Why choose the Metrological Test Bench

The Metrological Test Bench differs from other calibration devices in that the alcohol reference solution is mixed in the instrument and is composed of a customizable combination of water, alcohol, CO₂ and two other gas options (interferents) depending on laboratory requirements.

The Metrological Test Bench is highly sophisticated and ensures the simulated breath sample closely matches the temperature, volume and pressure of a human breath sample.

Temperature remains consistent and accurate throughout the process when being transferred from the Metrological Test Bench to the breath alcohol tester by means of the heated breath exit tube.

Volume coincides with the maximum volume of the human lung.

Pressure is maintained to match the pressure of a human breath sample.

Multiple device calibration

Breath alcohol testers: Passive, screening and evidential breath alcohol testers.

Sensors: Semiconductor, electrochemical and infrared.

Benefits

Highly accurate calibration.

Meets requirements of ISO 17025 calibration laboratories.

Meets requirements for performance testing against OIML R 126 1998 and 2012 test protocols.

Carefully control and closely monitor simulated breath sample temperature, volume, and pressure.

Specialized software allows laboratory technicians to monitor and control the calibration process.

Create custom simulated breath sample mixtures to closely match human breath and meet specific composition requirements (including a complete range of alcohol concentrations).

Breath simulation is much more accurate due to the following features:

- Breath sample composition is designed to match the chemical composition of human breath
- Volume coincides with the maximum volume of the human lung
- Pressure is controlled to be consistent with human breath pressure
- Temperature is tightly controlled and remains constant through a heated breath exit tube



Features

1. Multiple device calibration.
2. Heated breath exit tube maintains consistent temperature of breath sample.
3. View and monitor the composition of the gas mixture.
4. Monitor the progress of the calibration process.
5. Customize the composition of the breath sample mixture.

Alcohol Reference Solution

Alcohol Countermeasure Systems ARS is a premixed alcohol solution for immediate use, eliminating the need to mix solution in the field. It is prepared for use in a breath alcohol simulator which is capable of controlling the solution temperature at 34 ± 0.02 °C. When air (breath) is bubbled through this solution, an equivalent BrAC is generated.

Preparation

Absolute ethyl alcohol (USP Grade) is mixed with distilled water to provide an analytical concentration predictive of the equivalent BAC. Solutions are prepared $\pm 2\%$ target value.

Analysis

Each batch of solution is independently analyzed by gas chromatography and is traceable to the NIST standard. A Certificate of Analysis is available upon request.

Bottling

The solution is bottled in high-density polyethylene bottles and closed with a poly seal cap. A neck seal is provided for integrity.

Labeling

Each batch of ARS is given a unique lot number and is further identified by the equivalent BAC, the date of manufacture and the expiry date for use. Each bottle and each box of six (6) bottles is so labeled.

Concentrations

Available in standard concentrations to provide alcohol breath test instruments with the following readings:

0.02, 0.03, 0.04, 0.05, 0.06, 0.08, 0.10, 0.11, 0.15, 0.20 and 0.40 g/dL.

All ARS bottles and cases manufactured by ACS indicate the concentration of the premixed alcohol reference solution on their labels.



Alcohol Reference Solution (6 x 500 mL bottles)

mg/dL	g/dL	Product number
20	0.02	95-000302
30	0.03	95-000303
40	0.04	95-000304
50	0.05	95-000305
60	0.06	95-000306
80	0.08	95-000308
100	0.10	95-000310
110	0.11	95-000311
150	0.15	95-000315
200	0.20	95-000320
400	0.40	95-000340

Metrology services

What is accurate measurement

- Meeting the specifications of your product or process
- Ensuring traceability for your measurements
- Meeting the requirements of your quality and accreditation procedures

Advantages of working with ACS

- We maintain international standards
- We ensure traceability of measurements to the SI system
- Our expertise is widely recognized, with accreditations from A2LA and TUV



Calibration and consulting services

ACS Metrology Laboratory is ISO 17025 and ISO 17034 certified, providing complete Metrology instrumentation repairs and NIST traceable calibration services for all types of test instruments.

- Metrology instrumentation repairs and calibration services for personal, professional and evidential breathalyzers
- Chemical and electrical calibrations such as DC voltage, current and frequency
- Flow calibration services for MFCs and rotameters
- Mechanical calibrations such as force and pressure for Mag gauges
- Thermodynamic calibrations for temperature measurement and generation calibrations
- General calibration services for all timers and stop watches



Parameter	Range	Instrument	Application
Chemical			
Ethanol concentration – Measure	0.1 to 2.4 mg/L	Infrared / Electrochemical	Breath alcohol tester
Electrical – DC/Low Frequency			
DC voltage – Measure	0 to 100 V	DMM	Power supply calibration
DC current – Measure	100 to 50 A	DMM	Power supply calibration
AC voltage – Measure	1 to 100 mV 10 Hz to 20 kHz	DMM Oscilloscope	Noise and ripple test
Hi-Pot test	0.1 to 5 kV 40 mA	Electrical safety tester	Universal calibration station safety test
ESD test	0.2 to 30 kV	Electrostatic discharge simulator gun	Products safety test
Flow quantities			
Flow – Measure	0.5 to 50 SLPM	DryCal Flow Calibrator	Mass flow controller, rotameter calibration
Mechanical			
Pressure – Measure	0 to 5 psi	Manometer	Magnehelic gauge calibration
Thermodynamics			
Temperature – Generate	-60 °C to 100 °C 101 °C to 150 °C 151 °C to 325 °C	Environmental chamber Oven Water Bath	Products environmental test
Temperature – Measure	0 °C to 100 °C -200 °C to 300 °C 300 °C to 500 °C	Temperature controller, DAQ Thermistor, digital thermometer readout RTD probe Thermometer readout and probe	PRT and indicator, Wet Breath simulator, chamber and oven calibration
Force and mechanical			
Force – Measure	0 to 200 N	Force gauge stand	Plug strength test
Cable stress – Measure		Cable stress tester	Cable strength test
Time and frequency			
Stopwatches and timers	0.1 sec to 100 hours	NIST course time	

Available through:

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Quality management certifications



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