

11mm Breath Alcohol Sensor

The 11 mm compact breath alcohol sensor is available in two versions:

- A. A premium high performance version intended for use in automobile ignition interlock systems.
- B. An economy version intended for use in low cost personal breathalysers.

Introduction

The new DS 11 mm sensor incorporates the following features.

1. Small square wafer manufacture technology allows for mass production at low cost—the batch size is 768.
2. Using our type 3 interlock formulation (patent applied for) it gives high temperature resistance (to 90C) coupled with excellent low temperature kinetics.
3. Sensor housing is assembled with a combination of ultrasonics and heat methods—no resins or glues to soften or outgas.
4. The premium version is fully tested—test data available to customer; the economy version has a lower platinum loading and is leak-tested only.



Operational data

Maximum temperature 75°C

For operation at temperatures up to 75°C we recommend the use of a sensor shunt load resistor in the range 5 to 10 ohms, and a sample volume in the range 0.25 to 0.50 ml.

Here are repeat test data for the premium sensor obtained at room temperature on a dry gas sample equivalent to 0.5 ml of 0.160 BAC (integration to 5% of peak value).

Sensor 1 (recently manufactured)

160, 161, 161, 164, 161.

Sensor 2 (using components one year old)

160, 161, 158, 157, 155.

Maximum temperature 90C

For applications/test regimes where short term exposure to temperatures above 75°C and not exceeding 90°C we recommend the use of a sensor shunt load resistor in the region of 390 ohms, and a sample volume in the range 0.25 to 0.50 ml. These test data for the premium sensor were obtained at room temperature on a dry gas sample equivalent to 0.5 ml of 0.160 BAC (peak measurement).

	TEST	PEAK mV	PEAK mS
Sensor 3 (recently manufactured)	1	824	2616
	2	842	2681
	3	849	2763
Sensor 4 (using components one year old)	1	580	5230
	2	578	6020
	3	580	6167

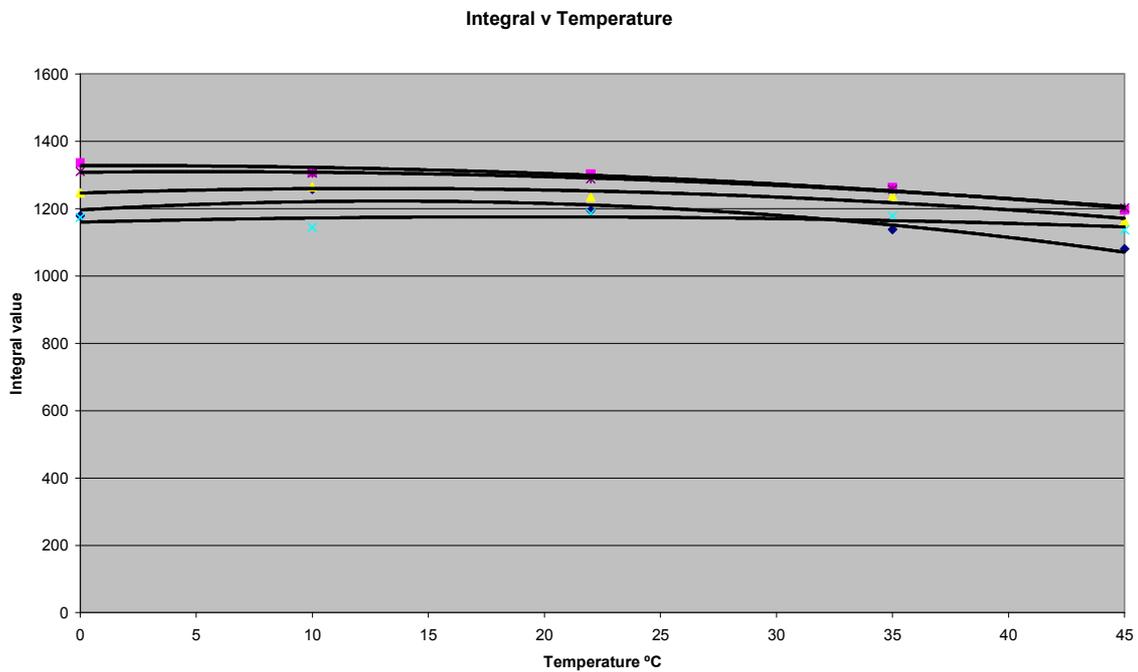
These sensors were then placed in an oven at 90°C for two hours, and further measurements taken at elapsed times after removal from the oven as shown. Peak measurements are shown as a percentage of values given prior to heat treatment.

	30 min.	1 hour	4 hours	20 hours
Sensor 3	83%	78%	83%	86%
Sensor 4	84%	86%	94%	101%

The older sensor recovers fully, whereas the newer one has probably stabilised at a lower level of activity. Sensors may thus be pre-stabilised by heating them to 75°C overnight.

Temperature coefficient of response

Here are typical temperature response data for operation on a low resistance load (integrated to 5% of peak value) for a fixed ethanol concentration (five sensors tested).



The very shallow change in integral values between 10°C and 30°C means that temperature compensation may not be necessary for low cost personal units. For more accurate results, individual units should be calibrated at least at three points across the temperature range of interest.

For interlock use it is usual practice to operate the sensor at a temperature of about 40°C to accommodate exposures to very low temperatures. This also prevents condensation and improves sensor kinetics, allowing faster integration of response. Temperature compensation below 40°C is then obviously unnecessary.

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