

## Evaluation Report : OOM110 / new inner cell

### PROBLEM DESCRIPTION:

The current oxygen sensor OOM110 includes in the outer housing a non-standard electrochemical inner cell. The cell is difficult to produce and components of that cell are no longer commercially available. Therefore it was investigated whether an ENVITEC standard OOM202 electrochemical cell can be integrated into the OOM 110 outer housing. The standard OOM 202 electrochemical cell has identical specification like the current OOM110 sensor.

### TEST OF MODIFIED OOM110 SENSORS

#### *Mechanical Stability:*

A shock and vibration test was carried out. The test conditions are summarized in the table.

	Test	Test Specification
1	Shock	150 m/s <sup>2</sup> / 11ms half sine 3 shocks in each perpendicular axis
2	Broad band random	10 – 100Hz: 1,0 m <sup>2</sup> /s <sup>3</sup> 100 – 200Hz: -3dB/oct. 200 – 2000Hz: 0,5 m <sup>2</sup> /s <sup>3</sup> Test time on each axis: 10 min
3	Free-fall	Two falls in each specified attitude from 0,25m
4	Free-fall Advanced requirements	Two falls in each specified attitude from 1m

The sensors were tested against acceptance criteria before the test and after the test. All results were within the specification.

#### *Test of Sensor Performance against Acceptance Criteria's:*

6 sensors with serial numbers A110781 to A110786 were produced. The sensors were tested against acceptance criteria. The results are summarized in the table.

Serial Number	Signal in Air (mV)	Signal in Oxygen (mV)	Offset in Nitrogen (mV)	Response Time (s)	Linearity Deviation (%)
A 110781	10,514	49,24	0,016	10,3	-1,885
A 110782	10,393	48,752	0,047	11,2	-1,727
A 110783	10,346	48,473	0,039	11,14	-1,845
A 110784	10,83	50,736	0,037	11,17	-1,854
A 110785	10,782	50,446	0,039	11,8	-1,981
A 110786	10,529	49,313	0,03	11,83	-1,88
Acceptance criteria	10 to 12 mV	See Linearity	< 0,2 mV	< 12 s	< 3%

All results were within the acceptance criteria.



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The results were compared with 6 recent sensors with current design:

Serial Number	Signal in Air (mV)	Signal in Oxygen (mV)	Offset in Nitrogen (mV)	Response Time (s)	Linearity Deviation (%)
V 103045	11,142	52,916	0,022	11	-0,503
V 103044	10,847	50,945	0,039	11,7	-1,604
V 103043	11,299	53,119	0,038	10,67	-1,51
V 103042	11,149	52,887	0,022	10,89	-0,62
V 103041	11,223	53,1	0,022	10,57	-0,878
V 103040	10,828	51,017	0,032	11,26	-1,292
Acceptance criteria	10 to 12 mV	See Linearity	< 0,2 mV	< 12 s	< 3%

No significant differences between the 2 designs were found.

### Conclusions:

It is possible to produce OOM110 sensors using a standard ENVITEC electrochemical sensor cell as inner cell. The sensors meet all specifications of OOM110. The new configuration makes the production process more reliable.

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