Product Characterisation Note

4AN CiTiceL® Acrylonitrile (C_3H_3N) Gas Sensor

Contents

Document Purpose

The purpose of this document is to provide indicative, technical performance data for the 4AN CiTiceL sensor to assist in the integration of the sensor into gas detection instrumentation. The sensor has been subjected to a testing program as part of the development process. Within this document, detailed information on the results of this program is presented. All data has been taken from equipment using a +9 VDC power supply.

This document and the information contained within does not constitute a specification. The data is provided for informational purposes only and is not warranted by the manufacturer. It should be used in conjunction with the 4AN Product Datasheet, Operating Principles (OP09) and the Product Safety Datasheet (PSDS 2).

NOTICE

- Ensure the sensor is biased for a minimum of 12 hours before use.
- Sensor may experience higher failure risk when continuously exposed to 90%RH / 50ºC for > 168 hours.

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The Gas Response Curve

The data in Figure 1shows a typical response curve for the 4AN.

Test data was taken from current production at the time of release of this document, and reflects the typical performance of a production batch at this time. A flow rate of 1 l/minute was used for both clean air and target gas.

The data in Figures 2 and 3 shows typical response and recovery profiles based on the data above.

Figure 1. 4AN Gas Response Curve – Clean Air

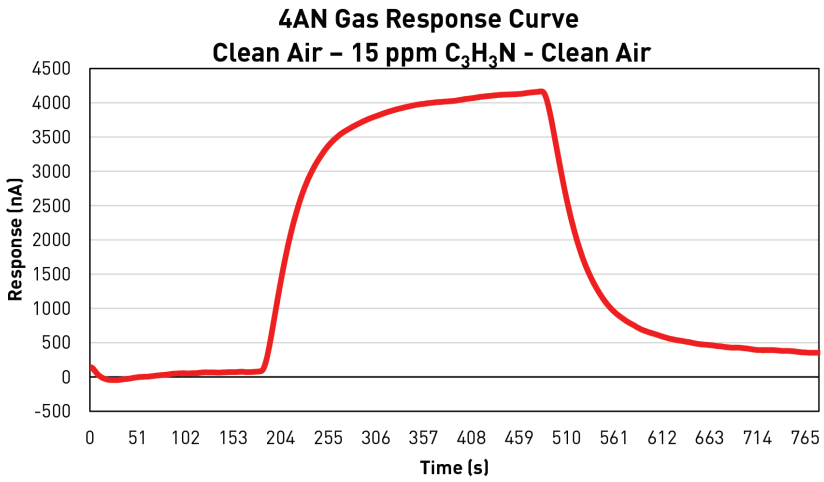


Figure 2. 4AN Gas Response and Recovery Profile

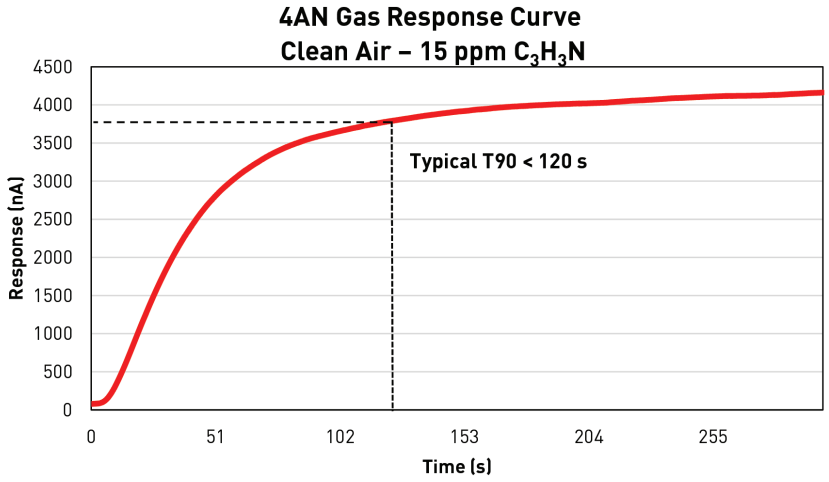
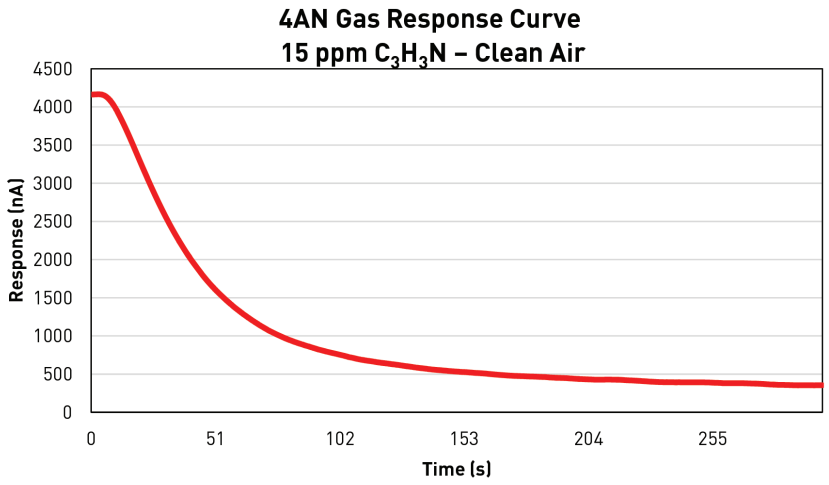


Figure 3. 4AN Gas Response and Recovery Profile



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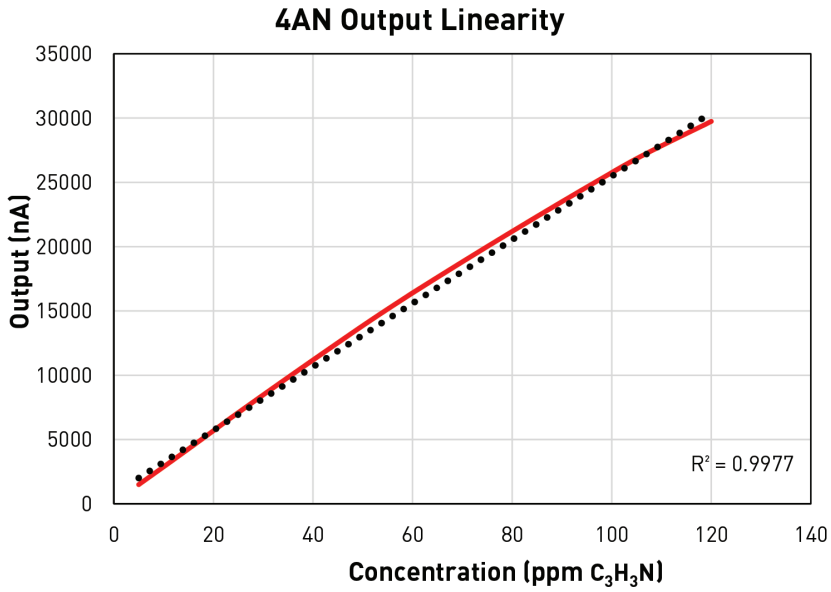
Linearity

The data in Figure 4 shows the typical linearity performance of the 4AN CiTiceL when subjected to differing acrylonitrile concentrations across the detection range. The presented results reflect the performance of a typical production batch. Across typical measurement ranges for industrial safety, the sensor can often be considered linear.

Figure 4. Output Linearity

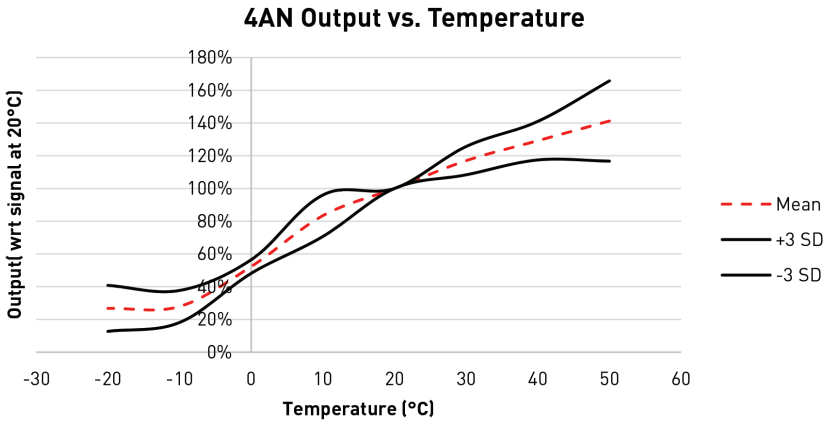


Temperature Characteristics

Variation of Output with Temperature

The output of the 4AN CiTiceL® will vary as a function of ambient temperature. The data in Figure 5 shows the typical output performance across the operating temperature range and is presented normalized to the 20°C value. For instruments that are expected to function across a wide range of ambient temperatures. City Technology recommends that an electronic compensation algorithm is used to ensure maximum accuracy. The presented results reflect the performance of a typical production batch.

Figure 5. Output vs. Temperature



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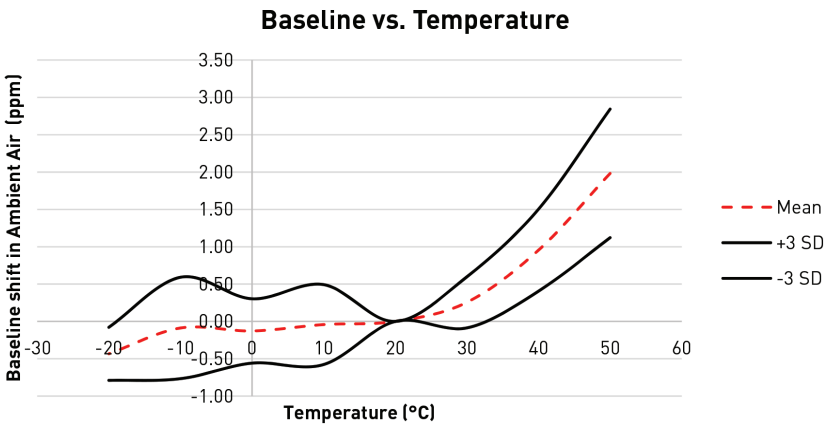
Variation of Baseline Offset with Temperature

The electrical output in the absence of target gas (baseline offset) of the 4AN will vary as a function of the ambient temperature. The data below shows typical 4AN performance across the operating temperature range, for sensors calibrated at 20°C. Although the variation is relatively small, City Technology recommends the use of offset correction factors so as to minimize inaccuracies in the span measurement. The presented results reflect the typical performance of a production batch.

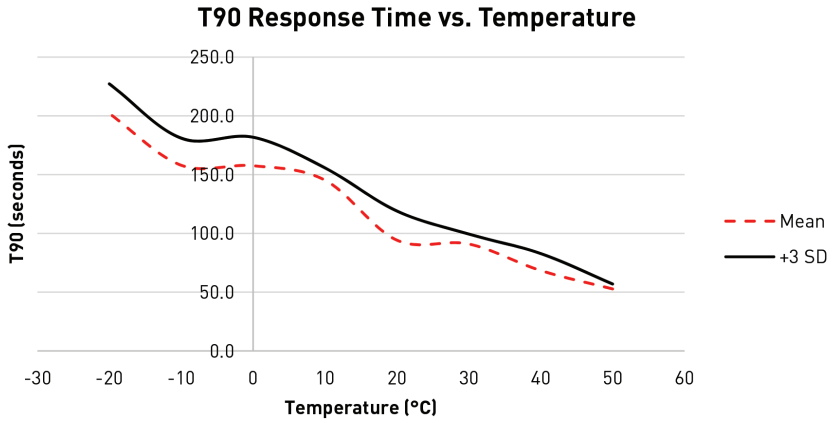
Figure 6. Baseline vs. Temperature



Variation of Response Time with Temperature

The response time of the 4AN will vary as a function of ambient temperature, typically getting faster at higher temperatures and responding more slowly at lower temperatures. The data In Figure 7 shows typical T90 response times of the 4AN across the operating temperature range. The presented results reflect the performance of a typical production batch.

Figure 7. Response Time vs. Temperature



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Cross Sensitivity Table

IMPORTANT NOTE

The cross-sensitivity data shown below does not form part of the product specification and is supplied for guidance only. Values quoted are based on tests conducted on a small number of sensors and any batch may show significant variation. For the most accurate measurements, an instrument should be calibrated using the gas under investigation.

Whilst CiTiceLs are designed to be specific to the gas they are intended to measure, they will still respond to some degree to various other gases. The table below is not exclusive and other gases not included in the table may still cause a sensor to react.

Figure 8. Cross Sensitivities

Gas	Concentration (ppm)	Cross sensitivity (ppm C_3H_3N equivalent)	Cross Sensitivity (%)
CO	300	23	7.6
H_2	10000	35	0.35
NO_2	5	1	20.17
Cl_2	1	-0.5	-48.19
NO	35	63	180.9
H_2S	15	74	492.42
HCN	15	13	84.22

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