



Nano Environmental Technology

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Gas Sensing Elements
Proudly 100% Developed and Manufactured in Italy

IRNET 20 mm Methane 5% Vol

CROSS INTERFERENCE MANUAL

- MT4355 -
REV. 1



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1. Introduction

This document is applicable only to IRNET 20 mm Methane sensor with 5% Volume as full scale range.

It is meant to this document to provide support and instructions to gas detector manufacturers to identify cross interference between this specific sensor and others Hydrocarbon gasses in LEL range.

It is important to note that IRNET 20 mm Methane sensors are not gas specific sensors, this means that they are sensitive to all the Hydrocarbon gases present in the test environment, as they share the same detection principle. So, it is impossible to discern a single gas in an environment in which is present a mixture of various hydrocarbon gases, for the use of the IRNET 20 mm sensors in such environments please contact NET.

Due to the different composition and different spectra of many hydrocarbon gasses, IRNET 20 mm Methane 5% Vol sensor has a response not linear in terms of temperatures and gas concentration of other gasses.

2. Description

Cross interference tests have been performed on these hydrocarbon gases:

Gas	Formula	CAS Number	LEL (% Vol)	Flash Point (°C)
Acetic Acid	C ₂ H ₄ O ₂	64-19-7	4,0	40
Ethane	C ₂ H ₆	74-84-0	2,4	-135
Ethanol	C ₂ H ₆ O	64-17-5	3,1	12

Tests have been performed in climatic chamber using 24 IRNET 20 mm sensors calibrated with Methane with 5 %Vol as full scale range. To these sensors have been applied the interference gas at different concentrations 25, 50, 75 and 100% of LEL and different temperatures (-40, -20, 0, 25, 40 and 60 °C) to cover the complete LEL range and temperature ranges.

LOWER FLAMMABLE LIMIT (LEL)

Concentration of flammable gas or vapour in air, below which an explosive gas atmosphere does not form.

Data reported in table above are extracted from IEC 60079-20-1 (2016).

FLASH POINT

The flash point of a volatile material is the lowest temperature at which vapours of the material will ignite, when given an ignition source.

At temperatures lower than flash point, sensor head's response decreases very quickly, indeed the response to this gas became very low.

TEST PERFORMED

In Chapter 3 are reported data collected for each gas applied.

In Chapter 4 are reported graphs of IRNET 20mm Methane sensor response in terms of absorbance and % Vol for data collected in Chapter 3.

3. Cross Interference Test

In this paragraph are reported cross interference data collected using 24 IRNET 20 mm Methane sensors.

Acetic Acid

LEL = 4,0 % Vol

FLASH POINT = 40 °C

Readings Applying Acetic Acid							
Applied. Gas (% Vol)	Applied. Gas (% LEL)	Concentration @ -40 °C (% Vol)	Concentration @ -20 °C (% Vol)	Concentration @ 0 °C (% Vol)	Concentration @ 25 °C (% Vol)	Concentration @ 40 °C (% Vol)	Concentration @ 60 °C (% Vol)
0,125	3,12	-	0,186	0,034	0,015	0,000	0,000
0,250	6,25	-	0,198	0,433	0,172	0,071	0,000

Measurements at -40°C have not been collected. Test has been performed up to 0,25 % Vol (6.25 % LEL), due to condensation of the gas inside the cylinder at higher concentration.

Ethane

LEL = 2,4 % Vol

FLASH POINT = -135 °C

Readings Applying Ethane							
Applied. Gas (% Vol)	Applied. Gas (% LEL)	Concentration @ -40 °C (% Vol)	Concentration @ -20 °C (% Vol)	Concentration @ 0 °C (% Vol)	Concentration @ 25 °C (% Vol)	Concentration @ 40 °C (% Vol)	Concentration @ 60 °C (% Vol)
0,6	25	1,275	1,302	1,348	1,412	1,457	1,508
1,2	50	3,196	3,333	3,552	3,811	4,049	4,301
1,8	75	5,514	5,735	5,955	OR	OR	OR
2,4	100	OR	OR	OR	OR	OR	OR

Applying ethane gas concentration above 1,2% Vol sensors reach overrange condition.

Ethanol

LEL = 3,1 % Vol

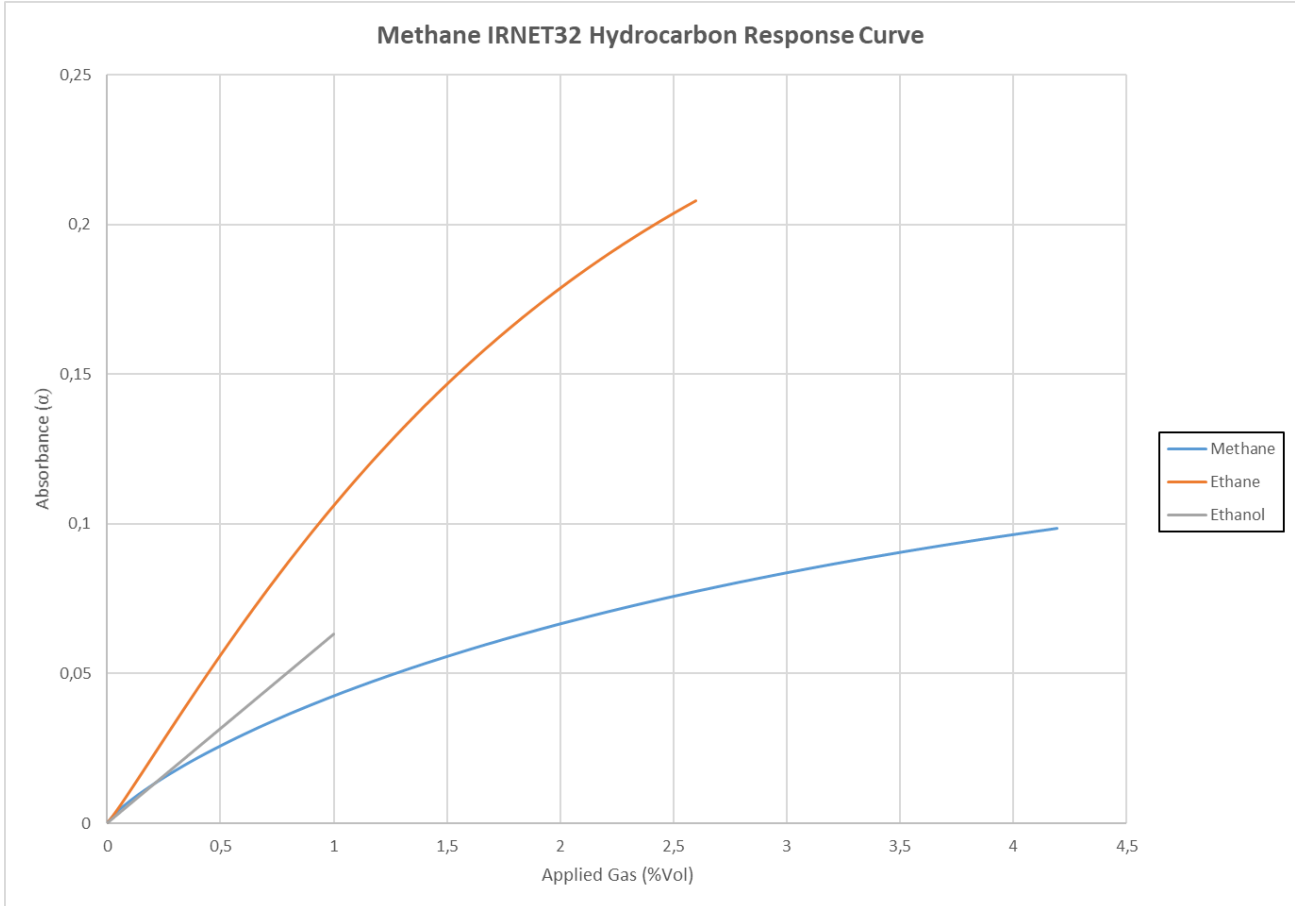
FLASH POINT = 12 °C

Readings Applying Ethanol							
Applied. Gas (% Vol)	Applied. Gas (% LEL)	Concentration n @ -40 °C (% Vol)	Concentration n @ -20 °C (% Vol)	Concentration n @ 0 °C (% Vol)	Concentration n @ 25 °C (% Vol)	Concentration n @ 40 °C (% Vol)	Concentration n @ 60 °C (% Vol)
0,50	16	-	0,016	0,438	0,479	0,520	0,575
1,00	32	-	0,089	1,050	1,222	1,336	1,449

Measurements at -40°C, -20°C and 0 °C are below the flash point. Data are collected up to 1,0 % Vol (32 % LEL), due to condensation of the gas in the cylinder for higher concentration.

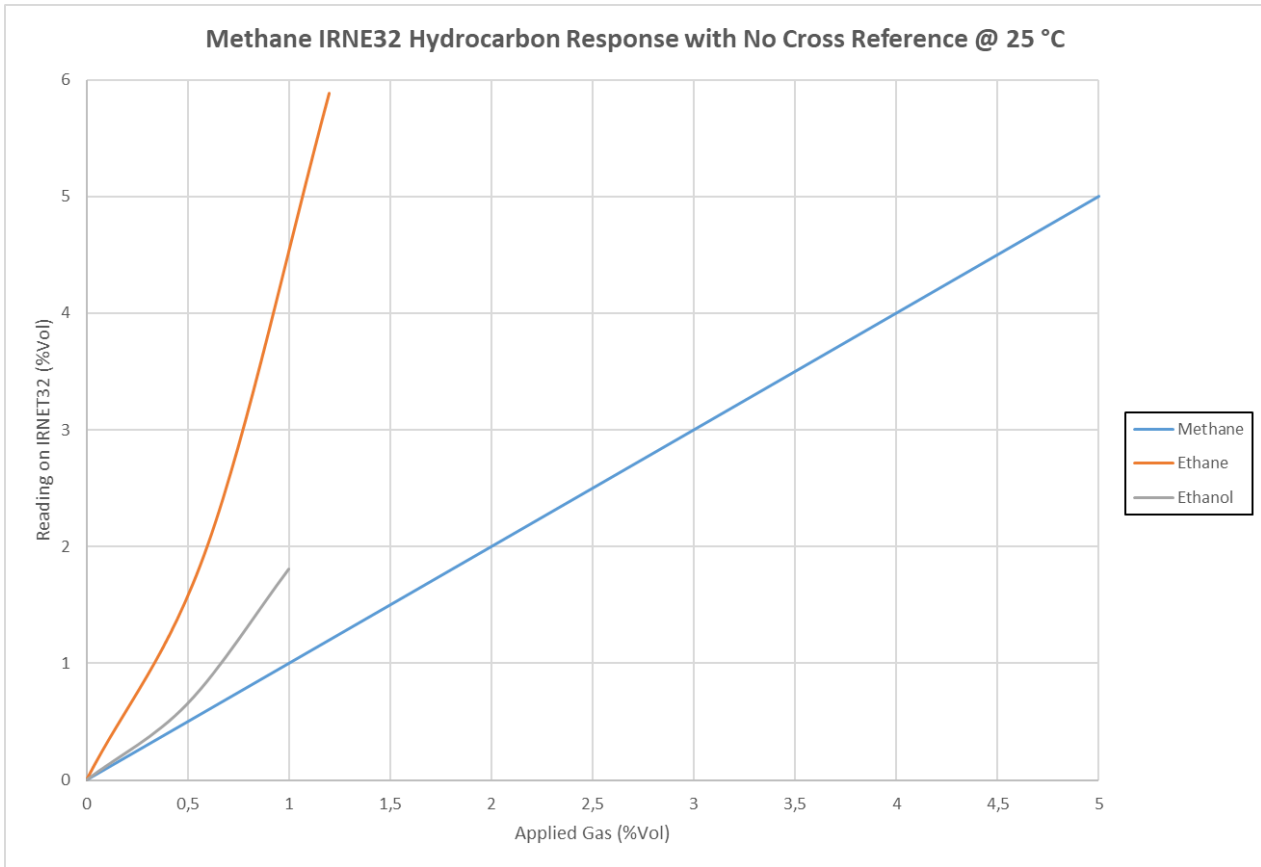
4. Hydrocarbon Interference on IRNET 20 mm Methane 5% Vol sensor

First graph shows the IRNET 20 mm Methane sensor response in terms of absorbance at 25 °C.



In blue is represented the absorbance curve of Methane. Other Hydrocarbon gasses has a different absorbance curve respect Methane, this causes a not linear behaviour of response in terms of response.

The graph shows the sensor behaviour in terms of % Vol reading. Not linear response of sensor absorbance causes bigger linearity error in terms of % Vol reading:



N.E.T. has a policy of continuous development and improvement of its products. As such the specification for the device outlined in this manual may be changed without notice.