

Gasmeter™ FTIR application note

Hazardous chemicals and materials (HAZMAT)

KEY WORDS

- Hazardous materials and chemicals
- Fourier Transform Infrared (FTIR)

PRODUCTS

- [DX4040](#) Portable FTIR Gas Analyzer
- [Calcmeter 4040 Professional](#) Analytical software package

OVERVIEW

Accidents involving chemicals and other hazardous materials require fast and accurate gas measurements as part of the first response. The DX-4040 portable FTIR gas analyzer provides reliable identification and concentration measurements of hazardous gases in 60 seconds or less.

The battery powered backpack-size analyzer records infrared spectra at 10 scans/second and is capable of sub-ppm detection. The DX-4040 requires no span gas calibrations and only a short zero procedure, and it is fully operational only minutes after arriving at site. The analyzer is controlled by a rugged PDA (personal digital assistant) connected to the analyzer by either serial cable or Bluetooth wireless link. The PDA is water-tight and shockproof, and proprietary **Calcmeter Lite** software is designed so that it can be operated with a single button if necessary.

The DX-4040 performs simultaneous analysis of 25 gases with compensation for cross-interference

effects. Identification of gases in addition to the 25 is possible by connecting the instrument to a computer and searching against a large library using **Calcmeter 4040 Standard** software. As the PDA automatically stores recorded spectra and the analysed concentrations, further analysis and verification is possible if required, and the results can be traced back to the original infrared spectra of the samples.



Figure 1 Gasmeter DX-4040 gas analyser is transported to site in a durable transit case.



Figure 2 Calcmeter Lite and TDS Recon rugged handheld computer provide a flexible user interface. Frequently used commands have shortcut buttons while various views provide the user with detailed information

TYPICAL GASES WITH DETECTION LIMITS AND MEASURING RANGES FOR HAZMAT / TOXIC INDUSTRIAL CHEMICAL (TIC) APPLICATION

Compound name	Formula	CAS number	Detection limit*	Range	Unit
Water	H ₂ O	7732-18-5		0 – 3	vol-%
Carbon Dioxide	CO ₂	124-38-9		0 – 3	vol-%
Carbon Monoxide	CO	630-08-0	0.25	0 – 200	ppm
Nitrous Oxide	N ₂ O	10024-97-2	0.02	0 – 100	ppm
Sulfur Dioxide	SO ₂	7446-09-5	0.03	0 – 100	ppm
Nitrogen Dioxide	NO ₂	10102-44-0	0.37	0 – 200	ppm
Methane	CH ₄	74-82-8	0.11	0 – 100	ppm
Formaldehyde	CH ₂ O	50-00-0	0.09	0 – 100	ppm
Toluene	C ₆ H ₅ CH ₃	108-88-3	0.13	0 – 200	ppm
Ammonia	NH ₃	7664-41-7	0.13	0 – 100	ppm
Hydrogen Chloride	HCl	7647-01-0	0.20	0 – 100	ppm
Hydrogen Fluoride	HF	7664-39-3	0.30	0 – 100	ppm
Hydrogen Cyanide	HCN	74-90-8	0.35	0 – 100	ppm
Arsine	AsH ₃	7784-42-1	0.02	0 – 100	ppm
Phosgene	COCl ₂	75-44-5	0.018	0 – 100	ppm
Acrylonitrile	CH ₂ CHCN	107-13-1	0.35	0 – 200	ppm
Ethylene Oxide	C ₂ H ₄ O	75-21-8	0.18	0 – 200	ppm
Boron Trichloride	BCl ₃	10294-34-5	0.01	0 – 50	ppm
Phosphine	PH ₃	7803-51-2	0.20	0 – 200	ppm
Acrolein	CH ₂ =CHCHO	107-02-8	0.25	0 – 200	ppm
Methylmercaptan	CH ₃ SH	74-93-1	0.41	0 – 200	ppm
Carbon Disulfide	CS ₂	75-15-0	0.17	0 – 200	ppm
Sulfuryl Fluoride	SO ₂ F ₂	2699-79-8	0.03	0 – 100	ppm
Dichloromethane	CH ₂ Cl ₂	75-09-2	0.10	0 – 200	ppm
Benzene	C ₆ H ₆	71-43-2	0.13	0 – 200	ppm

* Limit of detection is calculated 3 x standard deviation of baseline noise, 60 second averaging time.

This application note is meant to be an informative example of typical application where Gasmeter analyzers could be used. This is not a technical specification sheet. Information in this document is subject to change without prior notice. Optimal product configuration is application dependent, and exact application details such as detection limits, components included in the application, etc depend on process and/or measurement site details and may vary. Please, contact your local Gasmeter sales representative to get information specific to your needs.

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