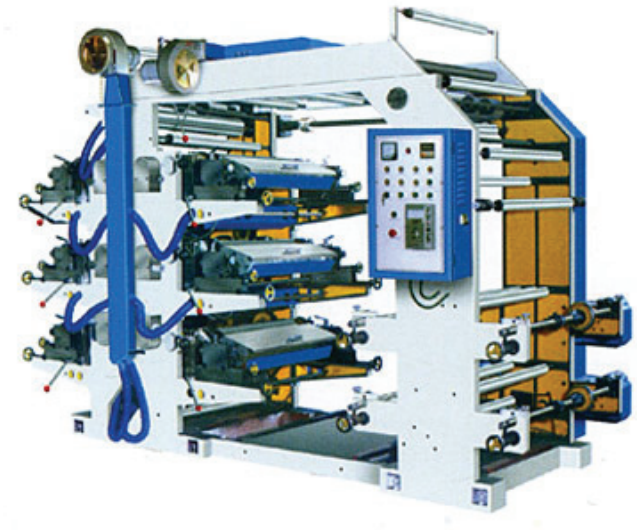
APPLICATION NOTE: Gasmet™ DX-4030 in industrial air quality monitoring

Measurement of Solvents in Print Factories



Typical printing processes utilize solvent based dyes and evaporation of solvent to factory air may expose workers to various chemicals. Different solvents have highly different long term exposure limits. Component specific measurements are necessary to protect the workers from exposure while avoiding unnecessary interruptions to the printing process.

Different Analysis Methods:

- Electrochemical sensors: cheap, cross-interference effects cause unnecessary alarms.
- Flame ionization detector (FID): Only total organic carbon (TOC) can be measured and lack of component specific information makes the interpretation of data difficult.
- Gas chromatography with manual sampling: sensitive, specific, lack of real time data due to batch sampling.
- Fourier Transform Infrared (FTIR): specific, sensitive, fast. Real time data allows real time countermeasures when concentrations increase

Gasmet DX-4030
Portable, battery powered analyser with rugged palmtop computer. Simultaneous real-time analysis of 25 components, sample averaging period 5 … 60 seconds.

Typical application for print house solvent monitoring

Gas	Range (in ppm)	Limit of detection*	Short term (15 min)**	Long term (8 hour)**
Acetone	0 – 500	0.07	1500	500
Ammonia	0 – 100	0.13	35	25
Cyclohexane	0 – 300	0.01	300	100
Ethanol	0 - 500	0.20	-	1000
Ethoxypropanol	0 - 150	0.05	-	-
Ethyl acetate	0 - 400	0.02	400	200
Isobutyl alcohol	0 – 150	0.05	150	100
Isopropanol	0 – 500	0.06	500	400
Methoxypropanol	0 - 150	0.05	150	100
p-Xylene	0 – 100	0.10	100	50
Styrene	0 – 250	0.16	250	100
Toluene	0 – 100	0.13	100	50

* Limit of detection is calculated as 3 × standard deviation of baseline noise

** European and/or British short and long term workplace exposure limits (WEL's).

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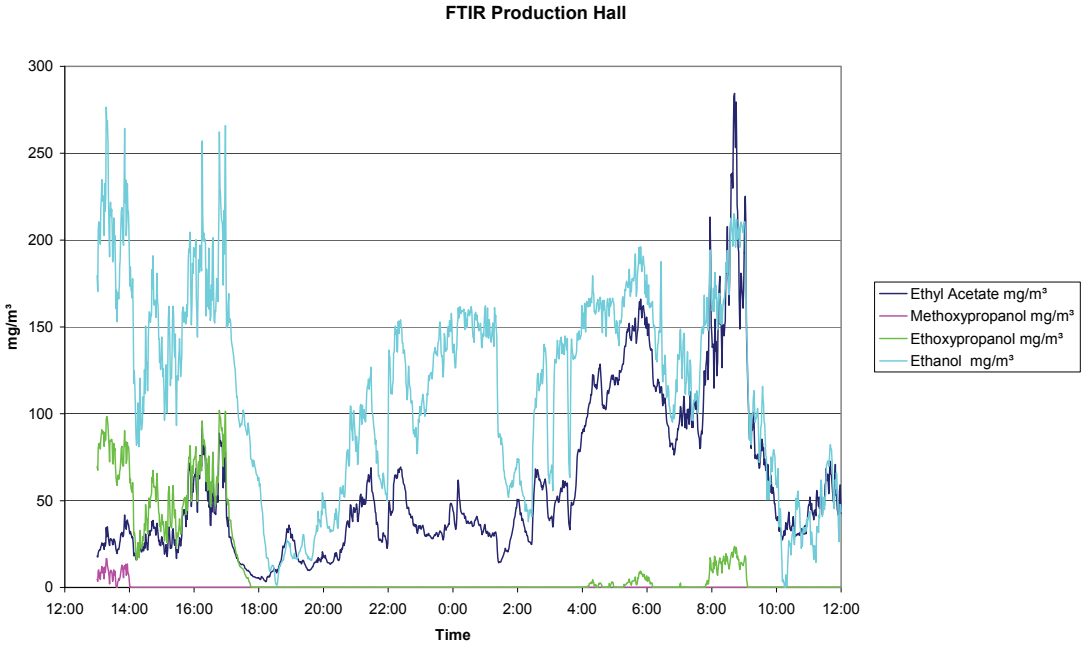
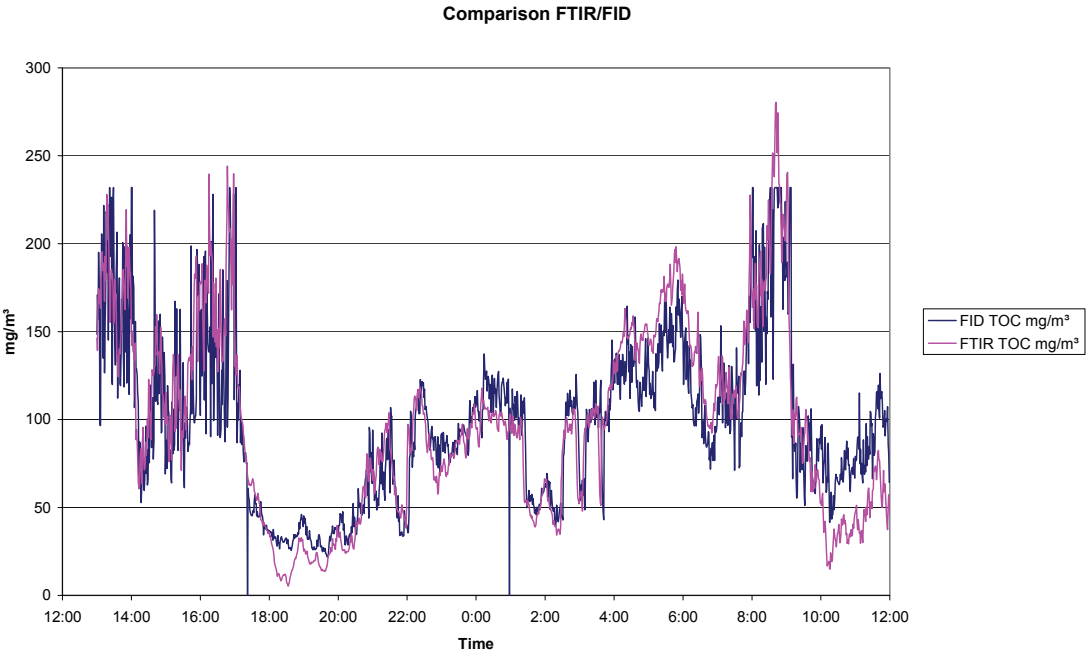
Application example

The figure below presents real time measured data with **Gasmet**™ FTIR gas analyzer from a plastic bag printing facility (Ommer, Germany). The flexographic or aniline rotary press uses Ethanol, Ethyl Acetate, Methoxypropanol and Ethoxypropanol as solvents and these solvents make up more than 50% of the ink used. Overall solvent emissions from this plant were estimated to be 136 kg/hour.



Comparison of FTIR and FID measurements: FTIR can produce virtually the same total organic carbon reading as FID, but also in addition component specific concentrations for different components.



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