

Automatic HCHO Analyzer

The **AL4021** is a completely automatic and continuously working formaldehyde (HCHO) analyzer for gaseous and liquid samples, based on the Hantzsch reaction. It is sensitive to lowest concentrations of HCHO less than 1 ppb. The **AL4021** is linear up to 3 ppm. All functions of the **AL4021** are controlled by an user-friendly touch-screen. The **AL4021** is easy to use, reliable and has a low need for maintenance.



Fields of Application

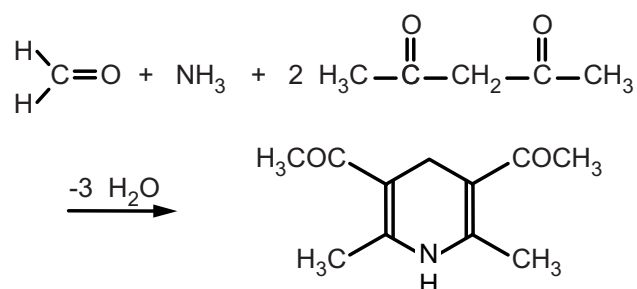
- ▶ Online monitoring of HCHO concentrations
- ▶ Process control / Quality control
- ▶ Emission monitoring / Emission limit control
- ▶ Chamber testing of wood-, plastic-, fabric-based products using up to 8 chambers simultaneously
- ▶ Environmental research / Trace gas analysis
- ▶ Measurement of indoor air quality

Features of the Instrument

- ▶ Provides absolute concentrations for formaldehyde in gas- and liquid-phase.
- ▶ WinCE controller with graphic interface (touch screen).
- ▶ Data storage to USB device.
- ▶ User programmable command sequencer for automatic operation.
- ▶ Fully automated calibration.
- ▶ Semi-automatic calibration by liquid HCHO-standard or automatic calibration using internal HCHO permeation source (optional). Automatic zeroing by internal zero trap.
- ▶ HCHO detection range: ~100 ppt – 50 ppm in air.
- ▶ HCHO detection range: ~150 ng/l – 70 mg/l in liquids.
- ▶ HCHO linearity range: ~100 ppt – 3 ppm (air), ~150 ng/l – 5 mg/l in liquids.
- ▶ HCHO detection limit: eq. to 2×10^{-9} molar aqueous solution.
- ▶ Time resolution: 90 sec (10% – 90%), delay time ~300 sec.
- ▶ Noise: 2% full scale.
- ▶ Dimensions: (19") 50cm × 49cm × 13cm. Weight: 20 kg.
- ▶ Power requirement: 110/220 VAC, 50/60 Hz, 110 W.
- ▶ Rugged and easy to use. RS232 interface.

Principle of Operation

The detection of formaldehyde is based on the liquid phase reaction of formaldehyde with acetylacetone (2,4-pentadione) and ammonia. This reaction produces 3,5-diacetyl-1,4-dihydropyridine (DDL), which is absorbing light at 410 nm and shows a strong fluorescence around 510 nm. This emitted light is measured by a photomultiplier. Compared to the colorimetric measurement of DDL, the continuous fluorimetric measurement is much more sensitive, faster and due to the short reaction time also less cross-sensitive to other aldehydes and ketones. Since the Hantzsch reaction works in aqueous solution, gaseous formaldehyde is transferred into aqueous solution first. This is achieved in a stripping coil where air and a stripping solution are brought into contact continuously at defined flow rates and contact surfaces. The air is then separated from the liquid stream and the solution is analyzed for formaldehyde. Size and flow rate of the stripping coil are optimised for a quantitative reaction of HCHO within short times.



Emission control of Wood-Based-Products

In combination with test-chambers (EN 717-2 / CARB) the **AL4021** can be employed for the measurement of HCHO emissions of wood based products like MDF or particleboards and all plastic materials containing HCHO. Contrary to conventional measurements, the HCHO concentration can be monitored online with a time resolution of 90 seconds. The concentration results are available after a few minutes. The **AL4021** can be connected to up to 8 emission test chambers. The sample gases from the chambers are linked to the instrument by a valve-block, which is driven by the Aero-Laser device control software.

