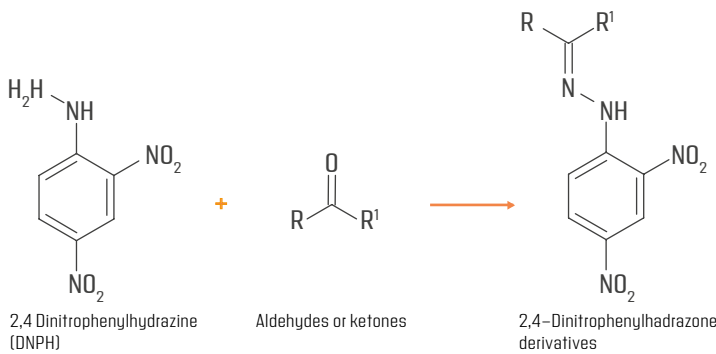


DETERMINATION OF FORMALDEHYDE IN INDOOR AIR /CAR INTERIOR PARTS

Formaldehyde is toxic and has been classified as carcinogenic since 1.1.2016. Plastic-based materials that contain formaldehyde as a synthesis component can outgas under certain conditions. Other „carbonyl emissions“ (short-chain aldehydes and ketones) are also of potential concern, so that their quantitative determination is the subject of various standards and test specifications. In order to comply with occupational health and safety requirements, the automotive industry has published test specifications for the interior of motor vehicles which describe the analysis of these carbonyl compounds [1–7].

One of the most important methods is the air analysis with dinitrophenylhydrazine (DNPH) cartridges described in the DIN ISO 16000–3 or VDI 3862 standard. Formaldehyde or other airborne carbonyl compounds are chemisorbed on the DNPH cartridge, derivatized in-situ and stable 2,4-dinitrophenylhydrazone derivatives are formed. After elution with acetonitrile the analysis is performed by HPLC and (mainly) UV detection. To minimize the blank value during storage (maximum 3 months, deep-frozen), the cartridges are also individually additionally sealed with a packaging. The package should only be opened immediately before use.

Fig.: Scheme for derivatisation of carbonyl compounds with 2,4-DNPH



The „standard-compliant“ DNPH cartridges from BEKOLut are silica-gel based and available in two different volumes – as a junior cartridge with 1 mL and as a „conventional“ 3 mL cartridge. Such cartridges can be easily coupled to an air collection unit via plug-in adapters and can also be closed again after passage. And they are also suitable for use in the field. Adverse effects caused by oxidative air components (ozone, NO₂) must be carefully checked during cartridge sampling (use of scrubbers if necessary).

Order information				Article number
Product	Sorbent weight	Volume	Unit / Pck.	
BEKOLut DNPH-Kartusche	350 mg (JUNIOR)	1 mL	20	B01-DNPH-A035
	350 mg	3 mL	20	B03-DNPH-A035

Literature:

- [1] VDA 275, Formteile für den Fahrzeuginnenraum, Bestimmung der Formaldehydabgabe, Meßverfahren nach der modifizierten Flaschenmethode, 1994–07
- [2] PV 3925, Polymerwerkstoffe Messung der Formaldehydemission, 1993–03
- [3] VCS 1027, 2739, Determination of formaldehyde emission from components in vehicle interiors, 2004–03
- [4] FLTM BZ 156–01, Determination of formaldehyde, aldehyde, and ketone emissions from non-metallic components, parts and materials in the vehicle interior, 2011–07
- [5] D40 3004/–A, Analysis of formaldehyde and other carbonyl compounds in the equipments of vehicle passenger compartment by liquid chromatography, 2011–07
- [6] AA–0061, Bestimmung der Emission von Formaldehyd aus nichtmetallischen Werkstoffen und Bauteilen mittels HPLC, 2014–02
- [7] GMW15635, Determination of Aldehyde and Ketone Emissions from Interior Materials, 2017–07
- [8] DIN ISO 16000–3, Innenraumluftverunreinigungen –Teil 3: Messen von Formaldehyd und anderen Carbonylverbindungen in der Innenraumluft und in Prüfkammern – Probenahme mit einer Pumpe (ISO 16000–3:2011), 2013–01
- [9] VDI 3862, Messen gasförmiger Emissionen Messen aliphatischer und aromatischer Aldehyde und Ketone nach dem DNPH-Verfahren Kartuschen-Methode, 2000–12