Scharlau

The wise choice

Solvents for gas chromatography

Introduction

Gas chromatography is an analytical technique that is widely used in both chemistry and biology to separate and analyse volatile and thermally stable mixtures of compounds. The technique is based on the principle that the individual components of a mixture can be separated by their different distributions between two immiscible phases, known as the stationary and mobile phases.

In the case of gas chromatography, an inert gas (the mobile phase) is used to transport the sample through a chromatographic column (stationary phase). First the sample is volatilised and injected into the column head, then the components are separated as they each interact differently with the stationary phase fixed inside the column. Components that experience strong retention by the stationary phase move slowly with the flow of the mobile phase, while those with a weak retention move more quickly. The choice of the correct solvent grade in which the sample will be solved before volatilisation is an essential factor. Any impurities in the solvent could be volatilised and analysed along with the sample, giving inconsistent and inaccurate results.

The separation of the components into bands can be used to identify them qualitatively and quantitatively. As such, gas chromatography systems include detectors so that each component's signal can be amplified and then integrated to obtain accurate analytical results. There are different types of detectors available and selecting the correct one depends on the type of components being tested. The choice of detector also determines the quality of the solvent to be used.

Gas chromatography is a highly sensitive and selective technique that can be used to analyse a wide range of organic and inorganic compounds. The technique's versatility and efficiency make it an indispensable tool in research, quality control and environmental analysis laboratories, among other fields. It is a widely used technique in the separation, identification, and quantification of mixtures of volatile or semi-volatile substances.

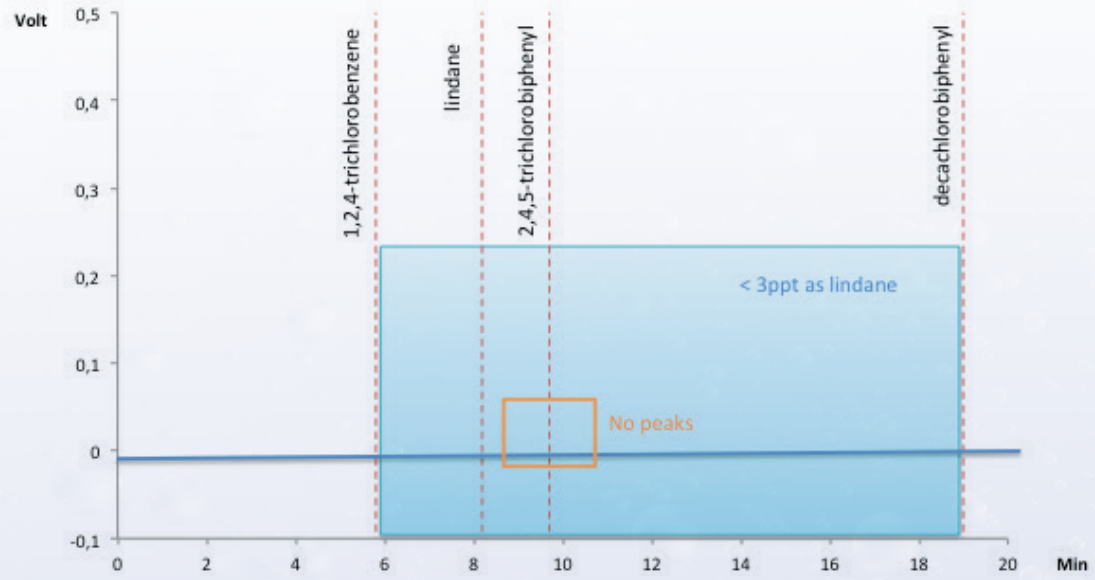
Scharlau offers a wide range of solvents for gas chromatography:

- *Solvents for residue analysis*
- *Solvents for ultra-trace analysis*
- *GC-MS solvents*
- *Headspace GC solvents*

Solvents for residue analysis

Scharlau's solvents for residue analysis are suitable for the extraction and concentration of the samples used in pesticide and environmental analysis procedures.
These processes concentrate both the residue sample and any impurities found in the solvent. As such, this type of analysis requires extremely pure solvents.
In fact, this grade is suitable for the analysis of low, medium and high boiling residues: organochlorine pesticides, dioxins, furans and PCBs.

Scharlau's solvents for residue analysis undergo strict quality control testing to ensure their suitability. They are concentrated ×1000 to ensure they are free of impurities in the working range: by using GC-ECD to ensure there are no peaks above 3 ppt (expressed as lindane), from 1,2,4-trichlorobenzene to decachlorobiphenyl. Absence of peaks in the area around the 2,4,5-trichlorobiphenyl peak.



Typical analytical conditions: Column: 100% DMS, 15 m × 0.25 mm × 0.25 µm; Oven temp.: 40 - 265 °C at 25 °C/min; Injector temp.: 250 °C; Detector temp. (ECD): 300 °C; Sample concentrated ×1000.

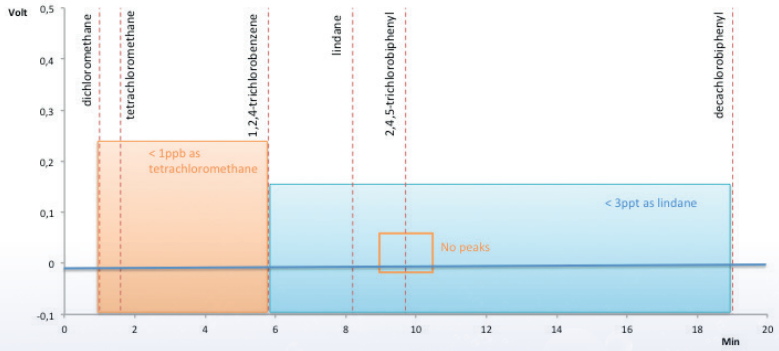
GC specification – for residue analysis (ECD)

Solvents for ultra-trace analysis

Scharlau's solvents for ultra-trace analysis are highly purified products developed especially for organic extraction and concentration procedures applied to environmental samples. They undergo additional stringent controls which means they can also be used for the analysis of highly volatile halogenated and polyaromatic hydrocarbons.

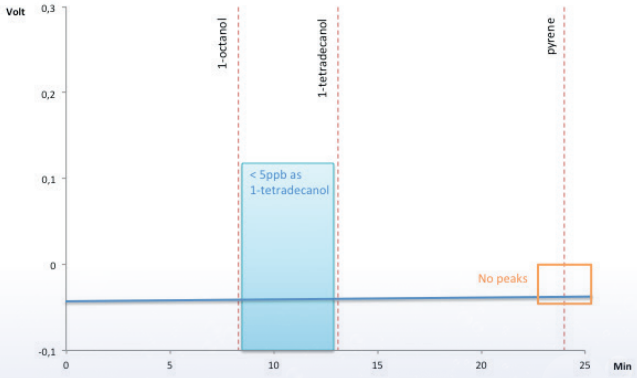
Scharlau ultra-trace solvents are guaranteed to be free from impurities when used with both GC-ECD and GC-FID detectors. Increased GC-ECD control: Absence of any peaks of highly volatile impurities greater than 1 ppb (expressed as tetrachloromethane), from dichloromethane to 1,2,4-trichlorobenzene. This quality also ensures there are no peaks of up to 2-3 ppt (expressed as lindane) from low, medium and high boiling point substances, from 1,2,4-trichlorobenzene to decachlorobiphenyl. Guaranteed to be no peaks in the area around 2,4,5-trichlorobiphenyl.

Control by GC-FID, ensures the absence of peaks greater than 2-5 ppb (expressed as 1-tetradecanol) from 1-octanol to 1-tetradecanol. No peaks in the vicinity of the pyrene peak.



Typical analytical conditions: Column: 100% DMS, 15 m × 0.25 mm × 0.25 µm; Oven temp.: 40 - 265 °C at 25 °C/min; Injector temp.: 250 °C; Detector temp. (ECD): 300 °C; Sample concentrated ×1000.

GC specification - for ultra-trace analysis (ECD)



Typical analytical conditions: Column: 100% DMS, 50 m × 0.32 mm × 1.2 µm; Oven temp.: 50 - 250 °C at 25 °C/min; Injector temp.: 300 °C; Detector temp. (FID): 300 °C.

GC specification - for ultra-trace analysis (FID)

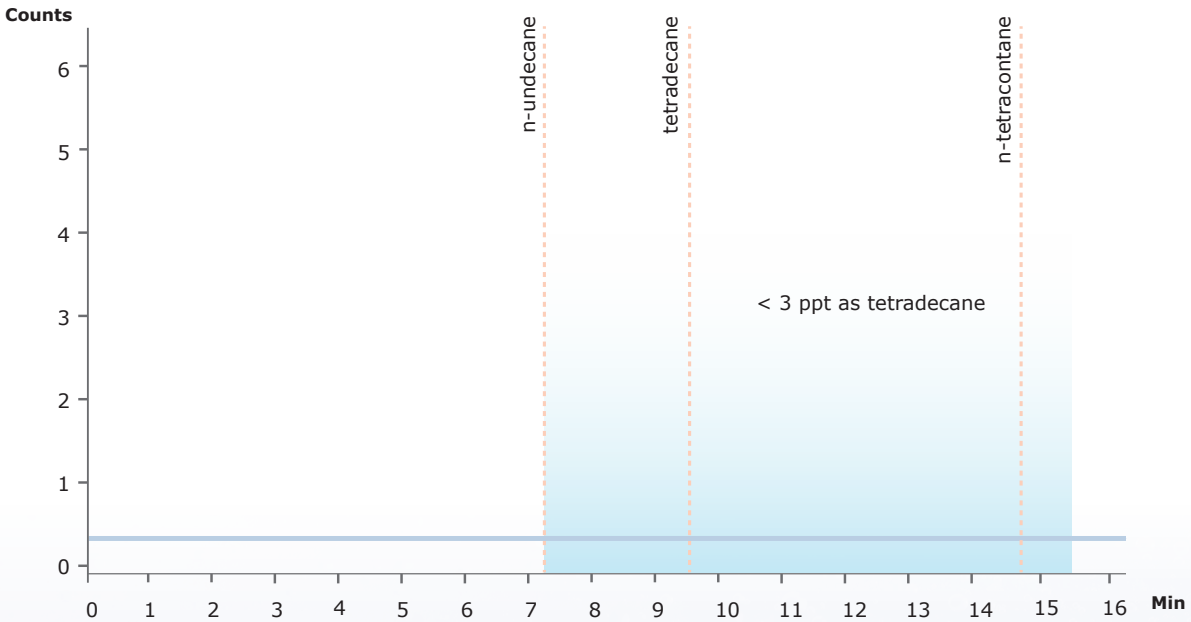
GC-MS solvents

Gas chromatography coupled with mass spectrophotometry (GC-MS) is a highly effective technique for the analysis and quantification of trace levels of compounds within complex matrices.

The mass spectrometer is one of the critical points in this technique; particles in suspension, metal impurities, column bleed, and so on, can all affect the detector, producing erroneous results and reducing the equipment's life cycle. GC-MS solvents, therefore, must be extremely pure products with minimal impurities.

Scharlau's GC-MS solvents are highly purified and microfiltered to remove any impurities, prevent blockages and reduce equipment maintenance. They are supplied in bottles that undergo a special passivation treatment to prevent the migration of any trace metals from the glass into the solvent. The bottle caps feature a special septum to stop phthalates migrating from the plastic into the solvent.

Controlled using GC-MS: the control is carried out by concentrating the sample ×1000. Absence of peaks above 3 ppt (expressed as n-tetradecane) from n-undecane to n-tetracontane.



Typical analytical conditions: SC-5MS column 30 m × 0.25 mm × 0.25 µm; Constant flow: 1.3 mL/min; Mode: Splitless; Oven temp.: 45 - 300 °C at 20 °C/min; Injector temp.: 280 °C; Detector temp.: 230 °C

GC-MS specification

Headspace GC solvents

The pharmaceutical industry must guarantee that its products are free from any impurities that could cause undesirable effects in consumers. Headspace gas chromatography is the primary method used by the pharmaceutical industry to analyse and quantify volatile organic solvents.

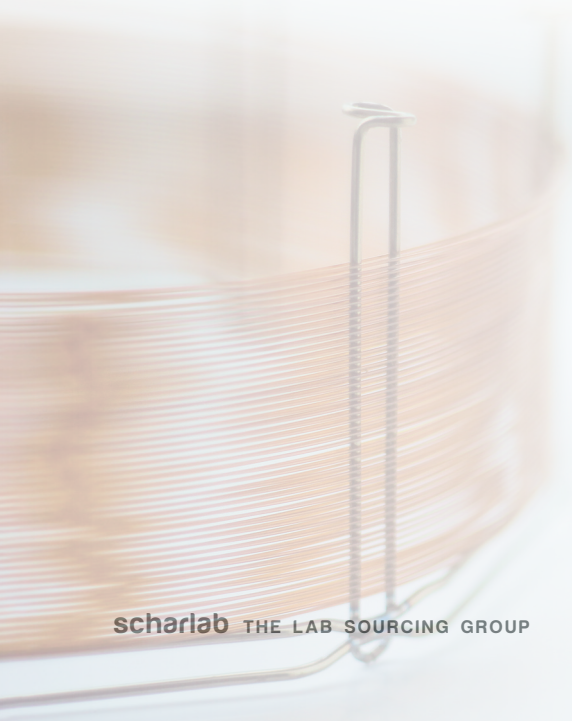
Scharlau's headspace GC solvents undergo special purification processes to remove all volatile impurities that would interfere with headspace GC analysis.
As the solvent bottling process is also critical, it is carried out in isolated areas to avoid product contamination with traces of other residual solvents present in the atmosphere.

Controlled by headspace GC: Each batch is checked via GC-HS to ensure that it is suitable for this technique. The exact quantities of trace solvents, if present, are stated in the Certificate of Analysis.

Maximum limits contained in our headspace GC solvents

Residual solvents	(mg/L)
Ethyl acetate	1
Acetone	1
Acetonitrile	0.4
Benzene	0
n-Butanol	1
Butyl acetate	1
Cyclohexane	1
Dichloromethane	0.6
1,4-Dioxane	0.4
Ethanol	1
Ethylbenzene	1
n-Heptane	1

Residual solvents	(mg/L)
n-Hexane	0.3
Isopropyl acetate	1
Methanol	1
Methylcyclohexane	1
Pyridine	1
2-Propanol	1
n-Propanol	1
tBME	1
THF	0.7
Toluene	0.9
m-Xylene	1
o-Xylene	1
p-Xylene	1



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Ordering information

Solvents for residue analysis

Description	Art. No*
Acetone, for GC residue analysis	AC0308
Acetonitrile, for GC residue analysis, suitable for QuEChERS	AC0338
2-Propanol, for GC residue analysis	AL0319
Cyclohexane, for GC residue analysis	CI0035
Chloroform, for GC residue analysis	CL0208
Dichloromethane, for GC residue analysis, stabilised with ethanol	CL0340
Dichloromethane, for GC residue analysis, stabilised with approx. 50 ppm amylene	CL0345
N,N-Dimethylformamide, for GC residue analysis, stabilised with ethanol	DI1068
Petroleum ether, boiling range 40 - 60 °C, for GC residue analysis	ET0098
Ethyl acetate, for GC residue analysis	AC0148
Hexane, for GC residue analysis	HE0223
n-Hexane, for GC residue analysis	HE0238
iso-Octane, for GC residue analysis	IS0157
Methanol, for GC residue analysis	ME0318
Methyl tert-butyl ether, for GC residue analysis	ME0553
n-Pentane, for GC residue analysis	PE0099
Toluene, for GC residue analysis	TO0081

Solvents for ultra-trace analysis

Description	Art. No*
Acetone, for GC ultra-trace analysis	AC0309
Cyclohexane, for GC ultra-trace analysis	CI0036
Dichloromethane, for GC ultra-trace analysis, stabilised with ethanol	CL0341
Petroleum ether, boiling range 40 - 60 °C, for GC ultra-trace analysis	ET0099
Ethyl acetate, for GC ultra-trace analysis	AC0149
n-Hexane, for GC ultra-trace analysis	HE0239
Methanol, for GC ultra-trace analysis	ME0319
n-Pentane, for GC ultra-trace analysis	PE0100
Toluene, for GC ultra-trace analysis	TO0082

GC-MS solvents

Description	Art. No*
Ethyl acetate, GC-MS	AC0137
Acetone, GC-MS	AC0293
Acetonitrile, GC-MS	AC0366
Cyclohexane, GC-MS	CI0028
Dichloromethane, GC-MS	CL0346
iso-Octane, GC-MS	IS0167
n-Hexane, GC-MS	HE0248
Methanol, GC-MS	ME0298
Toluene, GC-MS	TO0068

Headspace GC solvents

Description	Art. No*
Water, for headspace GC	AG0014
N,N-Dimethylacetamide, for headspace GC	DI0862
N,N-Dimethylformamide, for headspace GC	DI1074
Dimethyl sulfoxide, for headspace GC	SU0165
N-Methyl-2-pyrrolidone, for headspace GC	ME0503

**Consult available packaging*

Chromatography services

- *Method development service*
- *Column selection service*
- *Chromatography courses*

Find out more!

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