BENZENE

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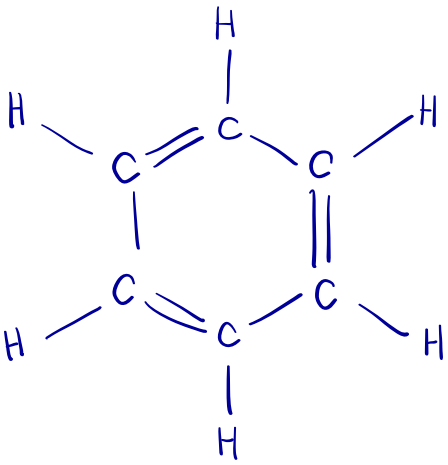
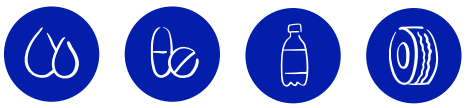


WHAT IS BENZENE?

Benzene is a colourless liquid with a characteristic odour.[1] When exposed to air it quickly evaporates. The chemical and pharmaceutical industries use it primarily as a solvent and a starting material or intermediate in the production of plastics, lubricants, rubbers, drugs and others.
Furthermore, benzene is a natural component of crude oil and gasoline.[2]



BENZENE: FLAMMABLE, TOXIC AND CARCINOGENIC

Benzene belongs to the BTEX family alongside toluene, ethylbenzene, and xylene. They are also called aromatics because of their sweet odour, which is often described as pleasant. Benzene evaporates easily and can be detected due to its distinctive smell at concentrations between 2.5 and 5 parts per million in air.

Workers are exposed to benzene in (petro-) chemical plants, oil refineries, coke works foundries and storage (distribution and use of petrol or benzene itself). Benzene is a hazardous carcinogen and is subject to very strict workplace thresholds.

Most non-industrial applications of benzene have been limited, but it still belongs to the largest commodity of organic chemicals. Employees must receive the best level of protection against any type of exposure. Furthermore, benzene vapor and air together form a heavy and explosive compound.

The danger of benzene to the human body is described by the H-statements enshrined in GHS/CLP regulations, which are internationally valid.

H225	Highly flammable liquid and vapor
H304	May be fatal if swallowed and enters airways
H315	Causes skin irritation
H319	Causes serious eye irritation
H340	May cause genetic defects
H350	May cause cancer
H372	Causes damage to organs through prolonged or repeated exposure
H412	Harmful to aquatic life with long-lasting effects

CAUTION BENZENE CAUSES CANCER!

Benzene has serious effects on the human body. Prolonged exposure can cause organ damage and genetic defects. Benzene is also highly carcinogenic and is classified as a group 1 carcinogen. Typical forms of cancer caused by benzene exposure are leukemia and lymphoma.

Benzene – chemical and physical properties[1]

CAS no.	71-43-2
Appearance and colour:	Liquid, colourless
Odour:	Aromatic
Odour threshold:	Approx. 5 ppm
Melting point:	6 °C
Boiling point:	80 °C
Flash point/flash point range:	-11 °C
Flammability:	Liquid and vapour highly flammable
Explosion thresholds: LEL (lower explosion limit)	1.2 vol-%
UEL (upper explosion limit):	8.6 vol-%

SELECTED INTERNATIONAL WORKPLACE EXPOSURE LIMITS FOR BENZENE (8 HOURS TWA)

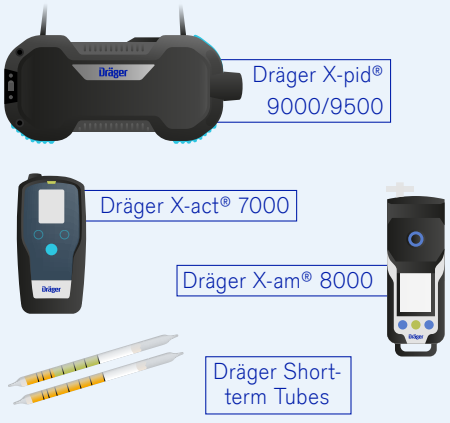
Country/Region	Parts per million	Mg/m^3
Europe	1	3.25
Germany (acceptance level)	0.06	0.2
Germany (tolerance level)	0.6	1.9
USA (ACGIH)	STEL: 2.5 TWA: 0.5	TWA: 1.6 TWA: 8
China (PC-STEL CN)	–	10
China (PC-TWA CN)	–	6
Singapore	1 PEL (LT)	3.18 PEL (LT)

Is your country not included?
Visit our hazardous substances database VOICE for more information: www.draeger.com/voice

MEASUREMENT OF BENZENE

Detecting aromatic hydrocarbons is not easy – particularly in low concentrations or as part of compounds. The choice of measurement method (selective or non-selective) depends on the measuring task (e.g. leak searches, workplace monitoring, pre-entry-measurement) and the measuring quality desired. The lower the workplace limits, the more challenging the measurement process.

Several selective and non-selective methods or an intelligent combination of it are suitable. A multi gas detector with PID sensor measures the cumulative concentration of existing VOCs in a non-selective way. For frequent selective random samples the analysis mode of the Dräger X-pid® 9000 or if less frequent, several Dräger Short-term Tubes like Benzene 2/a can be used. Spot measurements of concentrations down to 0.15 ppm can be done with the Dräger X-act® 7000.



Find more information about suitable measuring equipment in the chapter "Measuring carcinogens".

1 IFA. (n.d.-a). Benzene. Gestis Substance Database. Retrieved July 3, 2020, from http://gestis-en.itrust.de/nxt/gateway.dll/gestis_en/000000.xml?f=templates$fn=default.htm$vid=gestiseng:sdbeng$3.0
2 The Facts on Benzene. (2020, March 30). Roadmap on Carcinogens. https://roadmaponcarcinogens.eu/benzene/
3 Drägerwerk AG & Co. KGaA. (n.d.). Benzene . Dräger VOICE Databank. Retrieved July 3, 2020, from https://www.draeger.com/en_seeur/Applications/VOICE/Substances/37