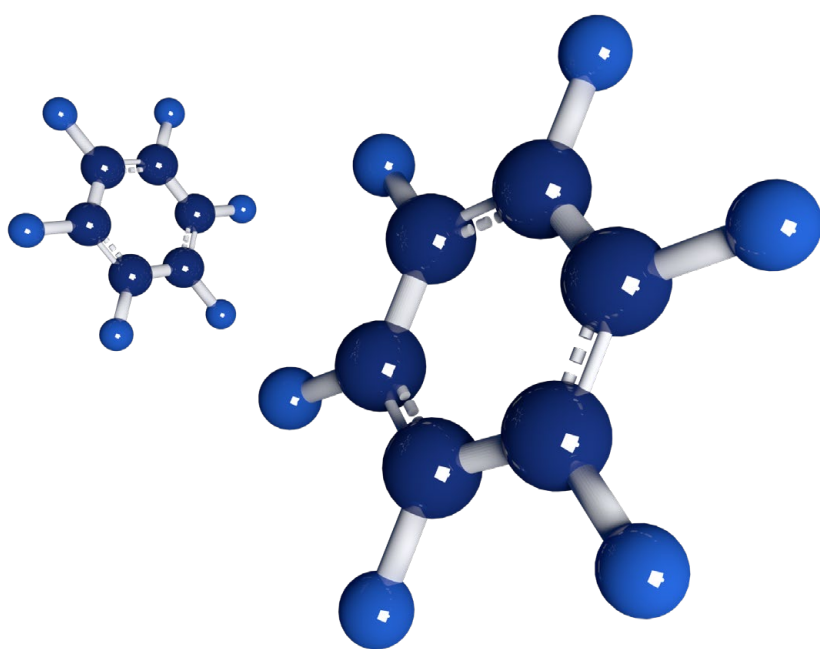


An introductory guide to Benzene Exposure Legislation

Properties : Exposure : Going forward

“Recognising the specific concerns over benzene, a hazardous carcinogenic chemical, the EU has turned to the European Chemicals agency (ECHA) to “review and evaluate the information already available and assess the most recent scientific information”. The review, entitled Proposal in support of occupational exposure limit values for benzene in the workplace was published for public consultation in October 2017 and final “opinions” will be published by 26th March 2018. The aim of the review will be to make recommendations to the next (4th) amendment to the directive on carcinogens.”



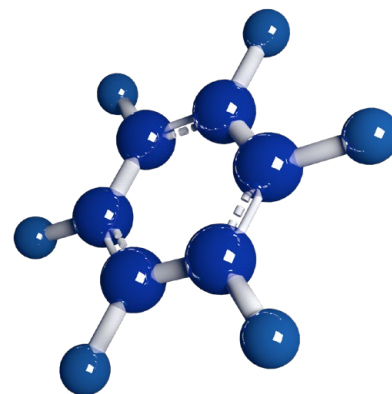
Dangerous substances, in liquid, gas or solid form that pose a risk to workers' health or safety can be found in nearly all workplaces. According to the European Agency for Health and Safety at Work (EU-OSHA)¹, 15% of workers across the European Union (EU) have to handle dangerous substances as part of their job, and another 15% report breathing in smoke, fumes, powder or dust at work which could be hazardous to their health.

Some highly dangerous substances, such as asbestos, are now banned or under strict control. However, other harmful substances are still widely used and consequently legislation is in place to ensure that the risks associated with them are properly managed. So whatever your thoughts on BREXIT and the concerns for the future of the UK's health and safety legislation, there is no denying that the EU has brought forward essential legislation relating to so-called physical and chemical agents in the workplace over the last two decades.

Indeed the Chemical Agents Directive² is 'celebrating' its 20th anniversary during 2018. In the UK it is implemented as the Control of Substances Hazardous to Health (COSHH) Regulations 2002 and transposition across the EU has been summarised by EU-OSHA³.

In addition, Directive 2004/37/EC⁴ was specifically introduced for carcinogens or mutagens at work and essentially requires that the employer assess and manage the risk of exposure to carcinogens or mutagens and to:-

- limit the quantities of a carcinogen or mutagen at the place of work;
- keep as low as possible the number of workers exposed;
- design the work processes so as to minimise the substance release;
- evacuate carcinogens or mutagens at source, but respect the environment;
- use appropriate measurement procedures (especially for early detection of abnormal exposures from unforeseeable event or accident);
- apply suitable working procedures and methods;
- use individual protection measures if collective protection measures are not enough;
- provide for hygiene measures (regular cleaning);
- inform workers;
- demarcate risk areas and use adequate warning and safety signs (including "no smoking");
- draw up emergency plans;
- use sealed and clearly and visibly labelled containers for storage, handling, transportation and waste disposal.



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Occupational exposure limits

Whilst there is nothing new in the concept of workplace exposure limit values a more recent EU Directive 2017/164/EU⁵ has introduced indicative occupational exposure limit values (IOELV). These are health-based, non-binding values, derived from the most recent scientific data available and availability of measurement techniques. For any chemical agent for which an IOELV has been set at EU level, member States are required to establish a national occupational exposure limit (OEL) value. They are required to take into account the EU limit value, determining the nature of the national limit value in accordance with national legislation and current practice.

Member States are required to bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 21 August 2018 at the latest. IOELVs are established in relation to an 8 hour, time-weighted average (TWA) and, for certain chemical agents, to shorter reference periods, in general 15 minutes time-weighted average also known as short-term exposure limit values (STEL) to take account of the effects arising from short-term exposure.

In the UK, the Health and Safety Executive (HSE) already publish OELs for a plethora of chemicals, including benzene, in a document known as EH40⁶ Workplace Exposure Limits (WEL). They refer to a WEL value which means the same thing as an OEL.

The EU-wide 8 hour TWA for benzene is currently set at 1 part per million (ppm), equivalent to a concentration of 3.25mg/m³. However, the ECHA review shows that some member states have a significantly lower OEL value which probably indicates the ‘direction of travel’ for the OEL given that the World Health Organisation (WHO) says there is no safe level of exposure⁸. It is also important to note the EU does not recommend an EU-wide benzene STEL value.

By contrast, legislation in the USA exists in the form of Federal Regulation 29 CFR part 1910⁹ and while the legislative framework is less complex than the EU, the limit values vary according to different ‘agencies’ plus they all state a value for the STEL.



The table shows the existing OELs indicated as an 8-hour TWA and 15-minute STEL (where stated) for selected EU member states and USA.

Selection of existing OEL's for EU member states and USA

	TWA (8 hours)		STEL (15 minutes)	
	ppm	mg/m ³	ppm	mg/m ³
EU	1	3.25	-	-
France	-	3.25	-	-
UK	1	3.25	-	-
Germany*	0.6	1.9	-	-
Denmark	0.5	1.6	-	-
Sweden	0.5	1.5	3	9
Netherlands	0.2	0.7	-	-
OSHA (USA)	1	3.2	5	15
ACGIH (USA)	0.5	1.6	2.5	8
NIOSH (USA)	0.1	0.3	1	3.2

* Tolerable risk 1:1000

Correct as at 17th October 2017

What are my workplace exposures?

Knowing the obligations of legislation and OELs, the question remains, how do I know if workplace benzene exposures are below the limits for my country? Unlike other health and safety issues that are managed by risk assessment, this can only be determined by monitoring. There are several monitoring solutions on the market but photoionisation detection (PID) has proven to be the ideal tool. PID based solutions are used in the following ways:-

- fixed instrumentation
- portable instrumentation
- personal instrumentation

Indeed a combination of all three solutions would provide complete worker and environmental protection and future guides will discuss product selection in more detail.

Disclaimer

The information provided in this guide is for informational purposes only. The materials are general in nature; they are not offered as advice on a particular matter and should not be relied on as such. Use of this guide does not constitute a legal contract. While we make every effort to ensure that the material in this guide is accurate and up-to-date when we publish it, you should exercise your own independent skill and judgment before you rely on it. In any important matter, you should seek professional advice relevant to your own circumstances.

References

1. <https://osha.europa.eu/en/themes/dangerous-substances>
2. Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work
3. <http://eur-lex.europa.eu/legal-content/EN/NIM/?uri=CELEX:31998L0024>
4. <https://osha.europa.eu/en/legislation/directives/directive-2004-37-ec-carcinogens-or-mutagens-at-work>
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6. <http://www.hse.gov.uk/pubns/books/eh40.htm>
7. <https://echa.europa.eu/documents/10162/214b2029-82fd-1656-1910-3e18d0906999>
8. <http://www.who.int/ipcs/features/benzene.pdf>
9. 29 CFR part 1910: Occupational Safety and Health Standards – Toxic & Hazardous Substances

About ION Science

Ion Science provide a portfolio of handheld, fixed and portable photoionisation (PID) detection instruments for the rapid, accurate detection of volatile organic compounds (VOCs). Find out more about our industry leading range of Benzene detection solutions by clicking on the links below.



Discover our range of Benzene detection solutions



TIGER SELECT

Hand held



CUB TAC

Personal



TITAN

Fixed

Offices (click for details):

UK (head office)

USA

China

India

Germany

Italy

France