

WES Review 2018

***New Advisory Notation Proposal:
Immediately Dangerous to Life or Health
Accessory document to Recommending health-based
workplace exposure standards and notations***

*Australian workplace exposure standards
and advisory notations*

Safe Work Australia (2018)



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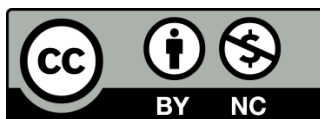
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New advisory notation proposal — Immediately Dangerous to Life or Health

This document proposes a new advisory notation, Immediately Dangerous to Life or Health, to accompany the workplace exposure standards.

Background

Exposure standards represent airborne concentrations of chemical substances in the workers' breathing zone which, according to current knowledge, should neither cause adverse health effects or undue discomfort to nearly all workers.

Under the model Work Health and Safety (WHS) laws, persons who conduct a business or undertaking (PCBUs) have a responsibility to:

- eliminate health and safety risks so far as is reasonably practicable, and if this is not reasonably practicable, minimise those risks so far as is reasonably practicable (section 17 of the model WHS Act)
- ensure, so far as reasonably practicable, workers and other people are not exposed to health and safety risks arising from the business or undertaking (section 19 of the model WHS Act), and

Additionally, under the model WHS laws, PCBUs have a responsibility to ensure that no person at the workplace is exposed to a substance or mixture in an airborne concentration that exceeds the exposure standard for the substance or mixture (regulation 49 of the model WHS Regulations). Therefore, in Australia, the exposure standards listed in the [Workplace Exposure Standards for Airborne Contaminants](#) are legally enforceable and businesses must not exceed these standards.

Australia's workplace exposure standards are published with advisory notations associated with the hazardous chemical. These notations consist of:

- classification of carcinogenicity
- classification of sensitisation, and
- the potential for systemic effects due to skin absorption.

The notations are provided with the exposure standard for information only, so a PCBU and workers can take action to minimise exposure and risks.

Proposal

It is proposed to include an additional advisory notation to be provided with the exposure standard for a hazardous chemical. This notation is an *Immediately Dangerous to Life or Health* (IDLH) parameter. This parameter was developed by the US National Institute for Occupational Safety and Health ([NIOSH](#)) to represent an airborne concentration of a chemical capable of:

- causing death or immediate or delayed permanent adverse health effects to a worker or
- impeding their escape from such an environment.

An IDLH is not considered an exposure standard as it represents a concentration that may cause harm, rather than a concentration at which no adverse effects are expected in nearly all workers.

However, it could provide PCBUs and workers additional safety information for non-routine workplace situations, such as working in confined spaces, industrial accidents (for example, chemical spills or explosions) or other uncontrolled-release scenarios and may help guide accident prevention and emergency response planning in the workplace.

What does an IDLH value mean?

Acute or short-term exposures to high concentrations of some airborne chemicals have the ability to quickly overwhelm workers, resulting in a spectrum of undesirable outcomes that may include irritation of the eyes and respiratory tract, severe irreversible health effects, impairment of the ability to escape from the exposure environment and in extreme cases, death. The IDLH values reflect an

airborne concentration of a chemical that represents a high-risk situation (rather than a routine workplace situation) that may endanger workers' lives or health.

NIOSH states that the IDLH values are established:

- to ensure that the worker can escape from a given contaminated environment in the event of failure of the respiratory protection equipment when the exposure is below the IDLH value, and
- to indicate a maximum level above which only a highly reliable breathing apparatus, providing a highly reliable breathing apparatus, providing maximum worker protection, is permitted.

With a few exceptions (see next section), IDLH values are generally health-based and derived following a critical assessment of the toxicology and human health effects data. An IDLH value is largely based on the lowest inhalational concentration known to cause acute irreversible health effects or death.

Alternative available parameters were considered (see Appendix 1), and IDLH values were considered the most appropriate parameter for adoption.

How is an IDLH value used?

IDLH values are concentrations that may cause adverse effects. They are not workplace exposure standards and should never be used in the place of a short-term exposure limit (STEL) or peak limitation.

The purpose of the values is to provide safety information in the event of accidental or unintended high exposure events and not for routine occupational exposure conditions. IDLH values may be used to help guide risk management and emergency plans. All available precautions should be taken to ensure that workers exit the environment immediately if exposures are at or near concentrations equivalent to IDLH values. Exposure should not exceed 30 minutes.

There are some situations where other environmental factors are more relevant than an IDLH value. These include:

- where the IDLH value is above the concentration that would result in oxygen deprivation (for example, inert gases), and
- where the IDLH value is higher than a particulate concentration that generates significant hazards from reduced visibility; such conditions may occur in processes that generate dust plumes in enclosed areas or confined spaces

Therefore, all relevant information should be considered in accidental or emergency exposure situations.

Source for IDLH values

The IDLH values will be adopted directly from [NIOSH](#) during the scheduled review of the workplace exposure standards (*WES Methodology: Regular review of the workplace exposure standards*¹). The underlying scientific data will not be scrutinised. However, not all NIOSH IDLH values will be adopted.

For some chemicals, such as those for which there were insufficient data to derive an IDLH value or if the derived IDLH value was greater than the concentrations permitted on the basis of assigned respiratory protection factors, NIOSH assigned IDLH values that were 10-2000 fold the occupational exposure limit. As there are no robust scientific data underlying this approach, values derived in this manner will not be adopted.

An IDLH value will not be adopted for a subset of the potential occupational carcinogens. For some potential carcinogens, particularly those that are considered to be non-threshold based carcinogens, even a single high acute exposure has the potential for carcinogenic effects; an IDLH value will not be assigned to these hazardous chemicals. Other carcinogens for which chronic exposure is required for tumour formation (for example those acting via chronic hormonal, inflammatory or irritation effects), an IDLH value will be adopted.

¹ Yet to be published

The NIOSH IDLH value for some chemicals is set at ten per cent of the lower explosive limit² (LEL), as this value is lower than that derived from health-based effects and the explosive risk is considered more of a concern in an emergency situation. These values will be adopted with the 'LEL' annotation that accompanies the value in the NIOSH IDLH list.

How many IDLH values are available for hazardous chemicals that have a workplace exposure standard?

A preliminary examination revealed that there are IDLH values available for approximately 360 hazardous chemicals on the [Workplace Exposure Standards for Airborne Contaminants](#) list. However, given the exceptions noted above, the actual number adopted will likely be lower than this.

Where will the IDLH values be located?

As the IDLH values are not workplace exposure standards and are intended only to provide advisory information, these values will not be published with the mandatory list of workplace exposure standards. Instead, they will be included in the Hazardous Chemical Information System (HCIS) database on the Safe Work Australia website. The HCIS database is provided as information only and is easily updated by an in-house administrator.

Consultation

Initial consultation has been conducted with the Government Occupational Hygiene Reference group (GOHR) and the approach is in line with the discussions and feedback provided.

Acknowledgements

This document is based largely on the NIOSH document [Derivation of Immediately Dangerous to Life or Health \(IDLH\) Values](#).

² The lower explosive limit is the minimum concentration of gas or vapour in the air, below which propagation of a flame does not occur in the presence of an ignition source.

Appendix 1 – Comparison of the IDLH scheme with alternative approaches

The United States Environmental Protection Agency (US EPA) has developed [Acute Exposure Guideline Levels for Airborne Chemicals](#) (AEGs). Which are threshold exposure limits for the general public intended to be guideline levels used during rare events or single once-in-a-lifetime exposures to airborne concentrations of acutely toxic, high priority chemicals. IDLH values were developed specifically for occupational scenarios.

There are three AEG levels:

- **AEG-1:** is the airborne concentration of a substance above which it is predicted that the general population could experience notable discomfort, irritation or certain asymptomatic, non-sensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.
- **AEG-2:** is the airborne concentration of a substance above which it is predicted that the general population could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
- **AEG-3:** is the airborne concentration of a substance above which it is predicted that the general population could experience life-threatening health effects or death.

[Emergency Response Planning Guidelines](#) (ERPGs) are developed by the American Industrial Hygiene Association (AIHA) and are intended to be used as planning tools for assessing the adequacy of accident prevention and emergency response plans, including transportation emergency planning, and for developing community emergency response plans. These guidelines are designed for the protection of the general population.

As with AEGs, there are three ERPG guidance concentration levels:

- **ERPG-1:** The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing other than mild, transient adverse health effects or without perceiving a clearly defined objectionable odour.
- **ERPG-2:** The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.
- **ERPG-3:** The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.

AEG, ERPG and IDLH values are developed for similar reasons, acute, emergency situations. However, AEG and ERPG values are developed for the general population, whereas IDLH values are developed for a worker population in a high-risk environment. Therefore, it was considered that IDLH values would be the most appropriate parameter to include with the workplace exposure standards. Furthermore, when available, there are three AEG values or three ERPG values for each chemical, associated with different risks, compared with a single IDLH value. As the acute, emergency situation parameter will accompany the workplace exposure standards, which list an airborne concentration associated with a low risk as well as additional safety advisory notations for each chemical, only one value is considered necessary for this parameter. Of the available acute, emergency situation parameters available, IDLH values are considered the most appropriate given the intended population group (workers) and the use of a single value (additional safety information is already available).