

Publication of DMAC 35 - Exposure Index for Pulmonary Oxygen Toxicity in Surface-Oriented Diving

Diving Division Members are requested to note that DMAC 35 *Exposure Index for Pulmonary Oxygen Toxicity in Surface-Oriented Diving*, has been published by the independent Diving Medical Advisory Committee (DMAC). The document can be freely downloaded from www.dmac-diving.org/guidance/.

Hyperoxic exposure monitoring aimed at reducing the likelihood of developing pulmonary oxygen toxicity (POT) has been traditionally incorporated into decompression tables. Decompression tables generally provide guidance on oxygen breathing time and pO_2 limits, with diving supervisors being less involved in detailed monitoring.

Historically, hyperoxic exposure monitoring has been characterised by using metrics such as Unit Pulmonary Toxicity Dose (UPTD) or Oxygen Toxicity Unit (OTU). However, these metrics are outdated, will not allow estimation of recovery, and are less accurate compared to the recently proposed Equivalent Surface Oxygen Time (ESOT).

DMAC 35 advises that ESOT should replace UPTD as an exposure measure for POT in surface-oriented diving i.e. for diving operations that require careful monitoring of hyperoxic exposure, ESOT should be used for dose calculations. The calculation of ESOT is similar to UPTD and is detailed in the guidance note. The guidance note stipulates exposure limits and addresses the need for a multiday break if the hyperoxic load is significant.

In surface-oriented diving using air as the breathing gas and adhering to IMCA maximum bottom time restrictions (see IMCA D 014, Appendix 2), pulmonary oxygen toxicity is minimal across all types of diving. ESOT calculation is unnecessary for such exposures, regardless of whether decompression is carried out as in-water, TUP, or SurDO₂. Nitrox dives with moderate bottom times (≤ 180 min) or $pO_2 < 1.3$ atm also do not require a multiday break. However, TUP dives and SurDO₂ dives with nitrox as the in-water bottom gas should be planned in accordance with DMAC 35 to avoid the development of pulmonary oxygen toxicity.

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Related Guidance

- [DMAC 35 Exposure Index for Pulmonary Oxygen Toxicity in Surface-Oriented Diving](#)
- [IMCA D 014 – IMCA International Code of Practice for Offshore Diving](#)