

OHTA pre-registration self-assessment for candidates

W501 Measurement of Hazardous Substances

The following are examples of topics covered in the course and calculations. Answers to all the following, and exam and homework questions are covered in the training course.

- Explain what is meant by the term “threshold” when applied to toxicology.
- Explain the difference between “hazard” and “risk” in regard to chemical substances.
- A worker is exposed to 1350 ppm for 1 hour, 220 ppm for 2 hours and 50 ppm for 5 hours of the same contaminant. What is his 8 hour TWA exposure?
- The average concentration of an airborne contaminant measured over an 8 hour period is 12 ppm. It is assumed that a worker is exposed to this concentration for the whole of a 10 hour shift. Calculate his TWA using the simple approach (direct proportional). Explain why this may not be satisfactory for protecting the health of the worker.
- A worker is exposed to 10 mg/m³ for 6 hours during a 12 hour shift. If there was not further exposure what is the 8 hour-TWA exposure?
- The TLV for benzene, which has a molecular weight of 78.11, is 0.5 ppm. What is the concentration in mg/m³ at NTP?
- What is the difference between direct biological monitoring and biological effect monitoring?
- How is it possible to collect respirable dust which has an ISO defined 50% cut point of 4 µm with PVC filters of 5 µm pore size without major losses through the filter?

Calculate the 8-hour TWA using the following information

Working period	mg/m ³	Duration of sampling (h)
0800 - 1030	0.32	2.5
1045 - 1245	0.07	2
1330	0.2	2
1545 - 1715	0.1	1.5

Assume exposure is zero in rest breaks 1030–1045, 1245–1330 & 1530–1545

$$\text{8-hr TWA} = \frac{(0.32 \times 2.5) + (0.07 \times 2) + (0.2 \times 2) + (0.1 \times 1.5) + (0 \times 1.25)}{8}$$

$$= \frac{0.8 + 0.14 + 0.4 + 0.15 + 0}{8}$$

$$= 0.19 \text{ mg/m}^3$$