

## **M504 Asbestos and Other Fibres – Answers to revision questions**

### **Section 3 – Health hazards and exposure limits**

1. What is the significance of asbestos fibre size with regard to health effects?  
(Pages 16 and 17)
  - Diameter of fibre influences deposition site, greater than 3 micron width deposit in upper respiratory tract – removed by body defences. Less than 3 micron width can reach alveoli where they may remain for many years. (Less than 2 micron diameter more hazardous.)
  - Length of fibre – less than 5 micron – probably little hazard. Longer fibres (5 – 100 micron) more hazardous.
2. What are the main potential health effects from inhalation of asbestos fibres?  
(Pages 18 to 22)
  - Asbestosis, lung cancer, mesothelioma
3. Explain, with the aid of a sketch, the main features of a typical dose response curve.  
(Pages 18 and 19)
  - Show response to a substance as a curve plotted against dose (or exposure).
  - May show a no-effect range, threshold dose, dose at which 50% or 100% of the persons exposed show the effect
4. Describe the characteristics of asbestosis, identifying those factors that influence the likelihood of developing this disease.  
(Pages 18 to 20)
  - Scarring of lungs, loss of elasticity and resulting reduced lung function
  - Only occurs with high exposure levels over many years
  - All forms of asbestos can cause asbestosis
5. Describe the characteristics of mesothelioma, identifying those factors that influence the likelihood of developing this disease.  
(Pages 20 and 21)
  - Malignant tumours in pleura (lining of lung cavity)
  - Risk increases with exposure levels, but may occur even with minimal exposure
  - Risk much greater from amphiboles (particularly crocidolite)
  - Long latent period from exposure to development of disease
6. Describe the characteristics of lung cancer, identifying those factors that influence the likelihood of developing this disease.  
(Pages 22 and 23)
  - Malignant tumours in lung tissues
  - Risk increases with exposure levels, but may occur even with minimal exposure
  - Risk much greater from amphiboles (particularly crocidolite)
  - Long latent period from exposure to development of disease
  - Risk greatly increased by smoking (synergistic increase)

7. Approximately what is the extent of asbestos related disease in various countries and in the world? (Pages 25, 26 and 34)
  - US – 8,000 deaths per year
  - UK – approx 4,000 per year – expected to rise
  - Australia – approx 500 per year
  - World-wide – approx 90,000 per year
8. Give examples of permitted limits of exposure to airborne asbestos in various countries (Page 26)
  - US, Australia – 0.1 fibres / millilitre averaged over 8-hour period
  - UK – 0.1 fibres / millilitre averaged over 4-hours + 0.6 f/ml over 10 minutes
9. Give examples of airborne asbestos fibre levels for various tasks and situations (Page 27)
  - Well controlled work with ACMs – generally less than 1 fibre/ml
  - Poorly controlled work with ACMs – up to 10s or 100s of fibres/ml
  - ‘Clearance’ indicator 0.01 fibres/ml
  - Background in buildings 0.0005 fibres/ml
10. For other fibres what factors appear to increase the risk of causing ‘asbestos-like’ effects on the lung (Pages 28 to 30)
  - Fibre size and biopersistence in the lungs
11. What types of exposure limits are there for man made mineral fibres? Why are there different types of limits? (Pages 31 and 32)
  - Fibre count and gravimetric limit – type of limit used depends on fibre size
12. Why is working with refractory ceramic fibres that have been subjected to high temperatures a particular concern? (Page 33)
  - Can form cristobalite (crystalline form of silica) that is hazardous by inhalation
13. Outline the WHO approach to eliminating asbestos related diseases (Pages 34 to 35)
  - Stop new use of asbestos
  - Replace asbestos with alternatives materials
  - Encapsulate / seal existing asbestos containing materials
  - If possible, avoid work on asbestos containing materials –if work necessary, only undertaken with strict precautions such as enclosure, wet methods, ventilation, decontamination procedures, PPE
14. Outline the UK approach to eliminating asbestos related diseases (Pages 36 to 38)
  - New use of asbestos banned
  - Historically, higher risk types and products phased out progressively
  - Licensed asbestos workers for higher risk work
  - Asbestos managed as part of a comprehensive system, including surveys, risk assessment, management controls and audits