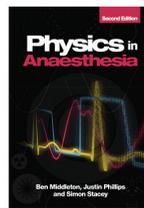


# Chapter 13

## Medical gas supplies



### Self-assessment questions

These questions and answers, in both MTF and SBA formats, accompany *Physics in Anaesthesia 2e* and link back to the book for guidance.

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### Multiple true / false questions

For each of the following questions, mark all answers as either true or false

#### 1. What do medical gas cylinders of oxygen, medical air, Entonox and Heliox all have in common at room temperature?

- They have the same shoulder colour
- They can all be supplied through PMGV
- The inside cylinder pressure is 137 bar
- They are stored in a gaseous state
- They have the same pin index system

#### Reminder

- PMGV is piped medical gas and vacuum.

#### Did you know?

- By 2025 all medical gas cylinders will have white bodies.

#### 2. Regarding a vacuum insulated evaporator:

- It is used to supply oxygen in small hospitals
- It should produce two pressure levels of gas supply: 400 kPa (4 bar) and 700 kPa (7 bar)
- Liquid oxygen is stored at low pressure and high temperature
- Oxygen is stored at 137 bar
- There is a large amount of gas delivered per unit volume stored

#### Reminder

- A bar is another metric unit of pressure, equal to 100 000 Pa (100 kPa).
- This is just slightly less than atmospheric pressure at sea level, 101.3 kPa.

#### Did you know?

- LOX, liquid oxygen, is blue.

#### 3. Regarding the hazards, cautions of use and storage safety of medical gas supplies:

- Every 5–10 years cylinders should have an internal examination with an endoscope
- The filling ratio of cylinders of liquid/vapour gases in the UK should be 0.75
- An area of 50 cm around anaesthetic equipment is a zone of risk
- Closed circuits are safer than open circuits
- Cylinders containing oxygen should only be stored with cylinders that have left-hand screw valves

#### Did you know?

- Other safety maintenance tests on cylinders include pressurisation (up to 25 000 kPa) and tensile tests.

## Single best answer questions

For each of the following questions, select the single best answer – note that more than one answer may be true but only one option represents the best answer

1. At room temperature the pressure gauges of two full cylinders of oxygen and nitrous oxide read 66 bar and 52 bar, respectively. As they are discharged, what will each cylinder read when there is 50% of the present amount of oxygen and liquid nitrous oxide remaining?
- 66 bar (oxygen cylinder), 26 bar (nitrous oxide cylinder)
  - 66 bar (oxygen cylinder), 52 bar (nitrous oxide cylinder)
  - 16.5 bar (oxygen cylinder), 13 bar (nitrous oxide cylinder)
  - The pressure in the oxygen cylinder would be lower than the pressure in the nitrous oxide cylinder
  - 33 bar (oxygen cylinder), 52 bar (nitrous oxide cylinder)

### Reminder

- Phase diagrams differ for gases that do and do not liquefy in cylinders (see *Figure 13.2*).

2. Why should an Entonox cylinder be kept warmer than  $-5.5^{\circ}\text{C}$ ?
- To prevent oxygen from liquifying
  - To promote the Poynting effect
  - To reduce frosting of the cylinder
  - To prevent lamination
  - To allow for removal of a dip-tube

### Did you know?

- Entonox can also be supplied by pipelines and via this method its pseudo-critical temperature is reduced further to  $-30^{\circ}\text{C}$ .

3. What indicates the most explosive mixture of a fuel?
- Filling ratio
  - Stoichiometric composition
  - Pin index system
  - Pseudo-critical temperature
  - Relative oxygen content

### Did you know?

- The lower the vapour pressure of a substance the more volatile it is, making combustion more likely in the presence of an ignition source.

# Answers to questions for Chapter 13 – Medical gas supplies

## Multiple true / false questions

*The following answers are true:*

1. c and d
2. e
3. a, b and d

## Single best answer questions

*The options below represent the single best answer, although other options may also be true:*

1. e
2. d
3. b