



T E C H N I C A L A R T I C L E



**Sofnolime® 2550 USP grade
Medical grade Soda Lime for
closed anaesthesia circuits**

Technical article

Medical grade Soda Lime for closed anaesthesia circuits

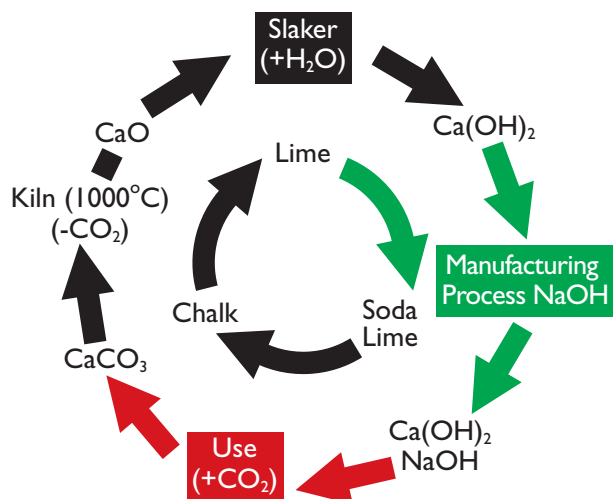
Frequently Asked Questions

Question 1:

Can Sofnolime[®] be regenerated?

Answer:

If you look at the soda lime cycle (below) starting with calcium carbonate, CaCO_3 , (chalk) that is mined and subsequently made into calcium oxide, CaO , (lime) at the quarry by heating and adding water (indicated in black) followed by the manufacturing procedure into soda lime done by Molecular Products (in green) and finally the user converting the Ca(OH)_2 back to the calcium carbonate by adding CO_2 (in red) it seems that the product can be recycled. However, it needs to be pointed out that the cycle cannot be repeated as the calcium carbonate at the end is a different form that the carbonate that started and recycling is not commercially viable. Also note that the Molecular Products formulation involves adding other components such as an indicator which of course cannot be recycled.



Question 2:

Why is water so important to Sofnolime[®]? Is it needed to start the reaction? Does it stop the reaction?

Answer:

Water is required at the start for the reaction and one extra mole of water is produced for each mole of carbon dioxide absorbed. This means that for each 44g of carbon dioxide absorbed it produces 18 g of water - that's why the water builds up in the circuit with time. If you have a situation where the system is allowed to saturate then the reaction will effectively stop since the Sofnolime[®] particles will be surrounded by a coating of water through which the carbon dioxide will only diffuse slowly. Conversely if the water content drops below about 10% the reaction to absorb carbon dioxide starts to slow down and effectively stops when the water content becomes 1%.

Question 3:

How important is dust in Sofnolime[®]?

Answer:

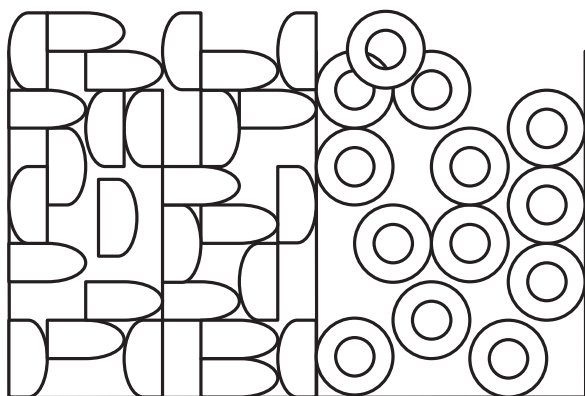
Dust should be avoided at all times. It may contaminate the circuit and valves and hence is a major quality issue. The Sofnolime[®] manufacturing process continuously monitors dust levels and no material is released unless it meets the product specification for particle size, including dust.

Question 4:

Why is Sofnolime® 'D' shaped and not spherical?

Answer:

One of the important properties of a packed absorber bed is the morphology (physical form and shape) and the surface to volume ratio as both are important in determining how fast the material can react and its usable capacity. To produce good gas / solid contacting we want a long winding path for the gas through the bed without any large straight channels. Some shapes pack very uniformly and can readily lead to large straight channels forming. A spherical particle tends to leave unreacted material at its centre as it is a long way from the surface to the centre. The 'D' shape used in Sofnolime® 2550 USP is a compromise between a material that provides high packing density with minimum channelling and high surface area with a minimum distance to the centre of the particle both of which facilitate high reaction rates and high capacity.

**Question 5:**

Does Sofnolime® medical grade interact with other components in the anesthesia stream?

Answer:

It is possible for some interaction to occur between the inhalation anaesthetic gas and the absorber. Desflurane can degrade to produce CO if it gets warm in the presence of a strong alkali. A material, often referred to as compound A, can be produced (only) from Sevoflurane under some conditions with strong base. Sofnolime® contains no potassium hydroxide which is known to increase the production of these compounds. It uses sodium hydroxide to catalyse the reaction to ensure a high CO₂ capacity whilst at the same time minimising the risk of anaesthetic agent interactions. Neither CO nor compound A form, in other than trace clinically insignificant amounts, in a properly run circuit. Extreme abnormal hot, dry conditions are required to produce significant quantities of any by-products.

Question 6:

Does the indicator dye have any adverse effect on the Sofnolime®?

Answer:

The dyes used are present at very low levels (>0.1%) and do not effect the performance of the absorber. There are some recorded instances of competitor products having produced amine smells for submarine and diving soda lime. This is attributed to the use of higher concentrations of a poor quality dye and was probably due to by-product impurities in the dyes themselves. Sofnolime® uses only high quality dyes sourced from carefully selected producers.

Molecular Products Ltd

Mill End, Thaxted, Essex
CM6 2LT, United Kingdom

T +44 (0)1371 830676
F +44 (0)1371 830998

E sales@molprod.com
W www.molecularproducts.com

Version 1, 19/05/09 MCL, JS