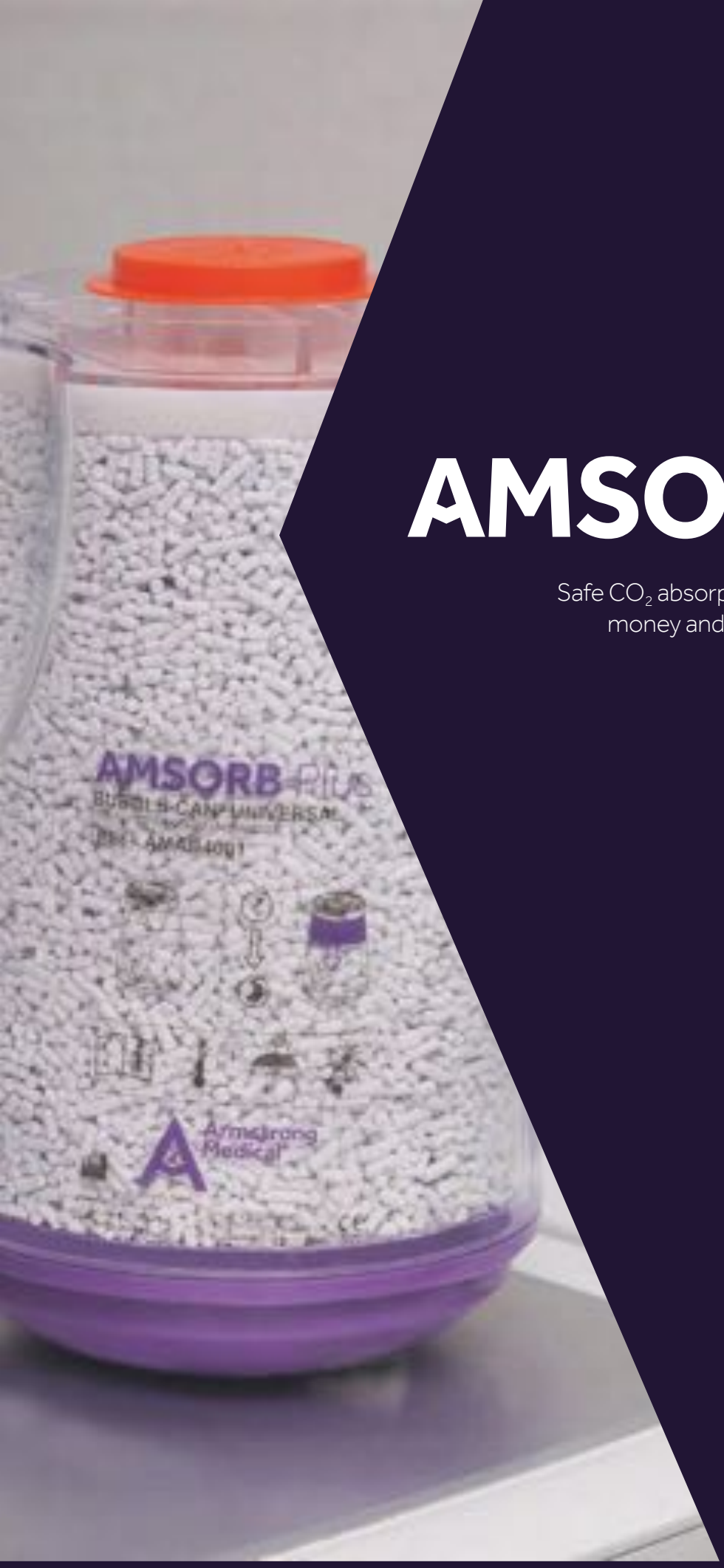


Creating Support for **Life**

AMSORB® Plus

Safe CO_2 absorption that eliminates dangers, saves money and decreases environmental footprint

Armstrong Medical

armstrongmedical.net

Contents

AMSORB® Plus

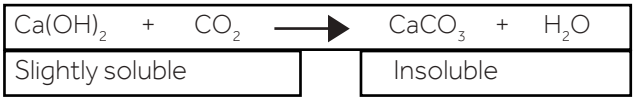
CO_2 Absorbent

AMSORB® Plus – absorbs carbon dioxide (CO_2) from cellular respiration during anaesthesia. Unlike other absorbents it is not capable of degrading vaporous anaesthetic agent. Use of AMSORB® Plus is supported by an extensive bibliography in peer-reviewed journals.

How AMSORB® Plus Works

The primary reaction is between CO_2 and calcium hydroxide ($Ca(OH)_2$) and water. These form calcium carbonate ($CaCO_3$) and water. Exothermic heat is a by-product of absorption. During absorption, $Ca(OH)_2$ is continually re-moistened until converted to $CaCO_3$. Lesser chemicals, calcium chloride ($CaCl_2$) and calcium sulphate ($CaSO_4$) prolong the life of $Ca(OH)_2$ and increase the speed of absorption reaction by maintaining granule strength and optimising hydration.

Chemical Reaction of Absorption



$Ca(OH)_2$ is an ionic compound which is soluble in water at 0.5g/L at 20°C:

- The ions are Ca^{++} and OH^- OH^-
- CO_2 is soluble in water at 1 vol : 1 vol at 20°C
- $CaCO_3$ is an insoluble ionic compound Ca^{++} and CO_3^{--}
- Reactions take place in solution when particles are mobile and react on collision

A colour indicator is present, changing from WHITE (fresh) to VIOLET upon exhaustion or desiccation. The indicator reacts to changes in granule hydration as absorption progresses; eventually remaining violet-coloured, once absorption is complete. Colouration also results from contact with ambient air or oxygen, if exposed to these.

Medico-Legal Implications

- **Carbon monoxide (CO)** is produced when passing sevoflurane, isoflurane and desflurane through certain brands of desiccated absorbent. CO is a potentially deadly toxin which users must ensure is not administered to patients, as carboxyhaemoglobin increases can trigger myocardial infarction or cause neurotoxicity in young or anaemic patients.

AMSORB® Plus DOES NOT PRODUCE CO

- **Formaldehyde (HCOH)** is produced when passing sevoflurane through certain brands of desiccated absorbent. HCOH is a potent inhalation irritant and carcinogen and should never be administered to patients. PONV is caused by HCOH inhalation.

AMSORB® Plus DOES NOT PRODUCE HCOH

- **Compound A** is produced when passing sevoflurane through certain brands of fresh or desiccated absorbent. Compound A has been proven to be nephro- and hepatotoxic in rats. Its effect in humans has not been established.

AMSORB® Plus DOES NOT PRODUCE COMPOUND A

Coppens et al. The mechanisms of carbon monoxide production by inhalational agents. Anaesthesia 2006; vol. 61; pp. 462-468

Keijzer C et al. Carbon monoxide production from desflurane and six types of carbon dioxide absorbents in a patient model. Acta Anaesthesiologica Scandinavica 2005; vol. 49; pp. 815-818

Knolle E et al. Small Carbon Monoxide Formation in Absorbents Does Not Correlate with Small Carbon Dioxide Absorption. Anesthesia & Analgesia 2002; vol. 95; pp650-655

Bedi A et al. The in vitro performance of carbon dioxide absorbents with and without strong alkali. Anaesthesia 2001; vol. 56; pp. 1-6

Yamakage M et al. Carbon Dioxide Absorbents Containing Potassium Hydroxide Produce Much Larger Concentrations of Compound A from Sevoflurane in Clinical Practice. Anesthesia & Analgesia 2000; vol. 91; pp220-224

Product Range

AMAB3000

5.0 litres jerican
Case Quantity - 2pcs

AMAB3201 1kg

1.2 litres cartridge
(without sealing gasket)
Case Quantity - 12pcs

AMAB3400

1.0kg bag
Case Quantity - 12pcs

AMAB3801

Prefilled G-CAN® absorber, 1.0 litres for GE Healthcare Aisys, Avance and Aespire anaesthesia workstations
Case Quantity - 8pcs

Use of AMSORB® Plus DOES NOT require approval of the anaesthesia machine manufacturer.

Product Range

AMAB3803

1.4 litres prefilled CARE-CAN
Case Quantity - 8pcs

AMAB4001 1kg

Prefilled UNIVERSAL BUBBLE-CAN® absorber, 1.2 litres for Dräger anaesthesia workstations including Apollo, Pallas and Primus
Case Quantity - 6pcs

AMAB4000/001

BUBBLE-PLATE®
Adapter for Dräger anaesthesia workstations
Case Quantity - 1pc

AMAB4000/002

BUBBLE-BLOC®
Adapter for Dräger anaesthesia workstations
Case Quantity - 1pc

AMAB0001

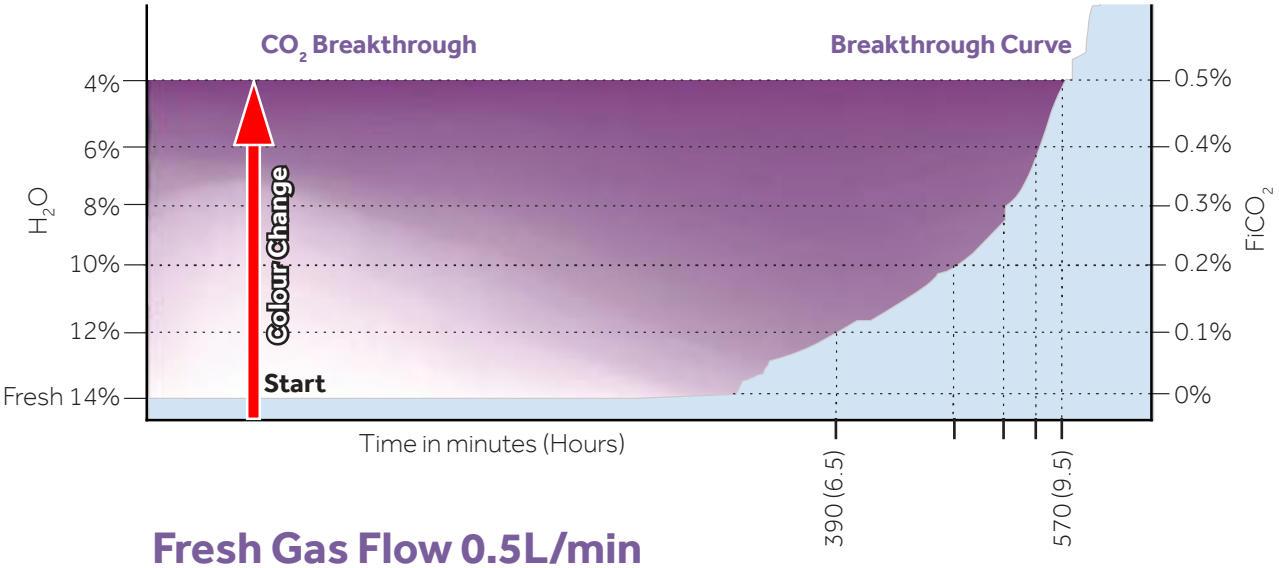
Limescale removal fluid, 500mL spray
Case Quantity - 1pc

Colour Change

Colour Change

AMSORB® Plus colour indicator reacts strongly and quickly to the dehydrating effects of CO_2 absorption or contact with anhydrous gas, such as oxygen. Whilst the colour change is an indication of the hydrated state and remaining capacity, depletion of the absorbent should be determined by capnometry and the absorbent changed when $FiCO_2$ has exceeded 0.5% volume or 5mmHg.

In the case of NaOH-containing (sodium hydroxide) absorbents, colouration reverts to white when contact with CO_2 ceases, often after a few hours of non-use. This is due to the strongly alkaline nature of NaOH in soda lime. Desiccation of soda lime through contact with anhydrous gas or moisture loss through exposure to ambient air DOES NOT trigger the colour indicator in soda lime and the soda lime can be desiccated but coloured white, thus appearing fresh and safe for clinical use. Soda lime is potentially dangerous to use when desiccated, as CO_2 absorption may continue.



Fresh Gas Flow 0.5L/min

Method: **in vitro** patient model. 1.0kg AMSORB® Plus. Tidal volume 500mL, respiratory rate 12 breaths per minute, fresh gas flow 500mL. min. O_2, 250mL/min. CO_2 added to expiratory limb. Colour change is permanent at the time of CO_2 breakthrough to 0.5% volume and remains provided the granules are not subsequently rehydrated. Not all granules will change colour.

When to exchange?

Avance®
Use until $FiCO_2$ exceeds 5mmHg, then exchange canister mid-case.

Aestiva®
Use until top canister shows total colour change, then exchange both canisters between cases.

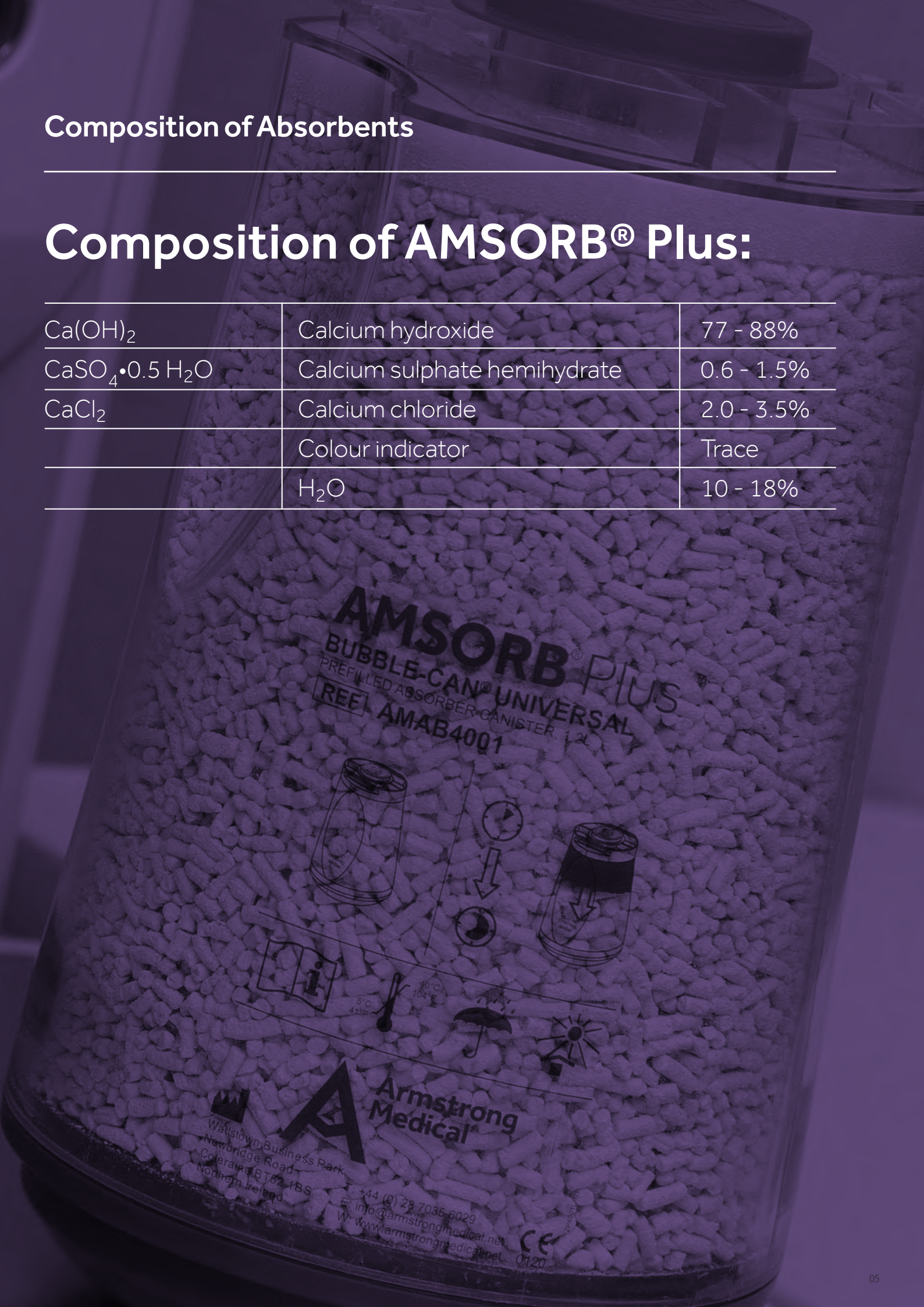
AMSORB® Plus is NOT the same as soda lime.

No production of CO or Compound A (even when desiccated). Low flow and closed-circuit techniques are safer, even with sevoflurane.

Discard as non-hazardous waste. AMSORB® Plus exhausted pH <12.5, is safe for landfill and breaks down to harmless inorganic compounds.

Composition of AMSORB® Plus:

$Ca(OH)_2$	Calcium hydroxide	77 - 88%
$CaSO_4 \cdot 0.5\ H_2O$	Calcium sulphate hemihydrate	0.6 - 1.5%
$CaCl_2$	Calcium chloride	2.0 - 3.5%
	Colour indicator	Trace
	H_2O	10 - 18%



Chemical Formulations and Performance

Product Name	Brand	NaOH*	Silicates	Other Additives	Permanent Colour Change	Agent Degradation**		
						Carbon Monoxide (CO)	Compound A	Formaldehyde
AMSORB® Plus	**Armstrong Medical**	**0%**		**<3% calcium chloride ($CaCl_2$)**	**YES**	**NO**	**NO**	**NO**
Drägersorb® Free	Dräger Medical	0.5-2%		<3% calcium chloride	NO	insufficient evidence available		
Sodasorb®	WR Grace	3.7%			NO	Yes	Yes	Yes
Drägersorb® 800+	Dräger Medical	1-3%			NO	Yes	Yes	Yes
Sofnolime®	Molecular Products	<3.5%			NO	Yes	Yes	Yes
Carbolime™	Allied Healthcare	3%			NO	Yes	Yes	Yes
Sodasorb® LF	WR Grace	<1%	1% quartz	trace phosphonic acid	NO	insufficient evidence available		
Medisorb®	GE Healthcare	<3.5%			NO	Yes	Yes	Yes
Spherasorb™	Intersurgical	1.3%	4% zeolite		NO	Yes	Yes	Yes
Sodalime	Carlo Erba	>3.5%			NO	Yes	Yes	Yes
LoFloSorb™	Intersurgical	0%	6.5% silica		NO	Yes	insufficient evidence available	

* sources: internal data and Olympio MA et al. Carbon Dioxide Absorbent Desiccation Safety Conference Convened by APSF. APSF Newsletter Summer 2005, vol. 20, No. 2, pp. 25, 27-29

** independently-published scientific literature

CO_2 Absorption Capacity

Review of independently published scientific literature for CO_2 absorption capacity of respective absorbent brands:

CO_2 Absorption Capacity (L/kg)								
	205	**217**						
		(186)						
	(155)		**146**					
								133
				107	**121**	**126**		
							73	
Product Name	**AMSORB® Plus**	Drägersorb® Free	Drägersorb® 800+	Medisorb®	Sodasorb®	Intersorb Plus™	LoFloSorb™	Spherasorb™
Brand	**Armstrong**	Dräger	Dräger	GE Healthcare	WR Grace	Intersurgical	Intersurgical	Intersurgical
Publication	Kobayashi, 2004	Kobayashi, 2004	Knolle, 2002	Higuchi, 2001	Higuchi, 2001	Knolle, 2002	Knolle, 2002	Knolle, 2002
	(Struys, 2004)	(Struys, 2004)						

Kobayashi S et al. Journal of Anesthesia 2004; vol.18; pp277-281

Knolle E et al. Anesthesia & Analgesia 2002; vol. 95; pp650-655

Struys MMRF et al. Anaesthesia 2004; vol. 59; pp584-589

Higuchi et al. Anesthesia & Analgesia 2000; vol. 91; pp434-439

Gas Toxicity

CO Production

Review of independently published scientific literature for CO production of respective absorbent brands:

Peak CO (ppm) from Desiccated Absorbent							
					13,317		
							9,045
						8,000	
		620					
			548	525			
	0						
Product	**AMSORB® Plus**	Drägersorb® 800+	Intersorb Plus™	LoFloSorb™	Medisorb®	Sodasorb®	Spherasorb™
Brand	**Armstrong**	Dräger	Intersurgical	Intersurgical	GE Healthcare	WR Grace	Intersurgical
Publication	Struys, 2004	Knolle, 2002	Knolle, 2002	Keijzer, 2005	Keijzer, 2005	Fang, 1995	Keijzer, 2005

Struys MMRF et al. Anaesthesia 2004; vol. 59; pp. 584-589
Knolle E et al. Anesthesia & Analgesia 2002; vol. 95; pp. 650-655
Keijzer C et al. Acta Anaesthesiologica Scandinavica 2005; vol. 49; pp. 815-818
Fang ZX et al. Anesthesia and Analgesia 1995; vol. 80(6); pp. 1187-1193

Agent Degradation

Some absorbents negatively impact patient safety. Their continued use raises ethical questions. Inability to determine when some absorbents are desiccated and hence potentially dangerous, demands that a safe absorbent is used.

Many absorbents are known to degrade anaesthetic vapour to produce toxic levels of CO and HCOH, when desiccated. CO is a toxin with affinity for haemoglobin greater than oxygen. HCOH is a potent respiratory tract irritant and carcinogen and has been shown to cause post-operative nausea and vomiting.

All absorbents desiccate through clinical use as well as through exposure to ambient air or gas flow. Absorbent hydration cannot be managed during use. In absorbents other than AMSORB® Plus, colouration, if present, is not a reliable indication of hydration. In all absorbents, the chemical reaction of CO_2 absorption forces moisture from the material. In many brands, this exponentially increases alkalinity; potentially enabling the absorbent to become sufficiently desiccated to degrade anaesthetic whilst continuing to absorb CO_2.

APSF (Anesthesia Patient Safety Foundation) states that absorbents that significantly degrade anaesthetic agents should not be used. This followed earlier notification by Abbott Laboratories that their drug Ultane (sevoflurane) was involved in adverse reactions with CO_2 absorbents.

Bedi A et al. The in vitro performance of carbon dioxide absorbents with and without strong alkali. Anaesthesia 2001; vol. 56; pp. 1-6

Agent Adsorption

Agent Adsorption - Patient Awareness

Anaesthetic vapour condenses on desiccated soda lime and on new generation absorbents containing molecular sieve zeolites, quartz or silica. This process, called adsorption, temporarily binds anaesthetic vapour within the absorbent. Knolle (2002) reported adsorption using LoFloSorb™ (Intersurgical, UK) of 89% of the inflow of 0.5% isoflurane for over 60 minutes, in combination with production of CO.

Adsorption is characterised by condensing and accumulation of the vapourised agent on the absorbent granules and re-vapourisation of the agent when canister temperature rises during CO_2 absorption; creating potential for reduced narcosis or blood toxicity from excessive drug exposure. This effect is greater at low fresh gas flow rates and when soda limes and LoFloSorb™ are used.

Clinical signs of adsorption will include inspired concentrations of the anaesthetic agent being different to the vapouriser setting. Recollection, by the patient of the surgical event or pain during surgery is possible, given inadequate anaesthesia.

Use of muscle relaxants could mask a patient's response to surgical stimuli, allowing patient awareness to go unchecked. Also, the cost of adsorption of vapour into the absorbent should be considered when choosing a brand of absorbent.

Adsorption of Anaesthetic Vapour

Adsorption of 0.5% isoflurane by desiccated absorbent (% : mins)					
				89% for >60 min	
					50% for 33 mins
			31% for 20 mins		
		26% for 16 mins			
	20% for 15 mins				
Product	**AMSORB® Plus**	Drägersorb® 800+	Intersorb Plus™	LoFloSorb™	Spherasorb™
Company	**Armstrong**	Dräger	Intersurgical	Intersurgical	Intersurgical

Publication	Knolle E *et al.* Small Carbon Monoxide Formation in Absorbents Does Not Correlate with Small Carbon Dioxide Absorption. Anesthesia & Analgesia 2002; vol. 95; pp650-655

Alkalinity of Soda Lime

NaOH Concentration Increases as Soda Lime Desiccates

Exponential increases in alkalinity triggers degradation of anaesthetic vapour to toxic inhalants. Safe disposal of soda lime must take account of increases in alkalinity brought about by desiccation.

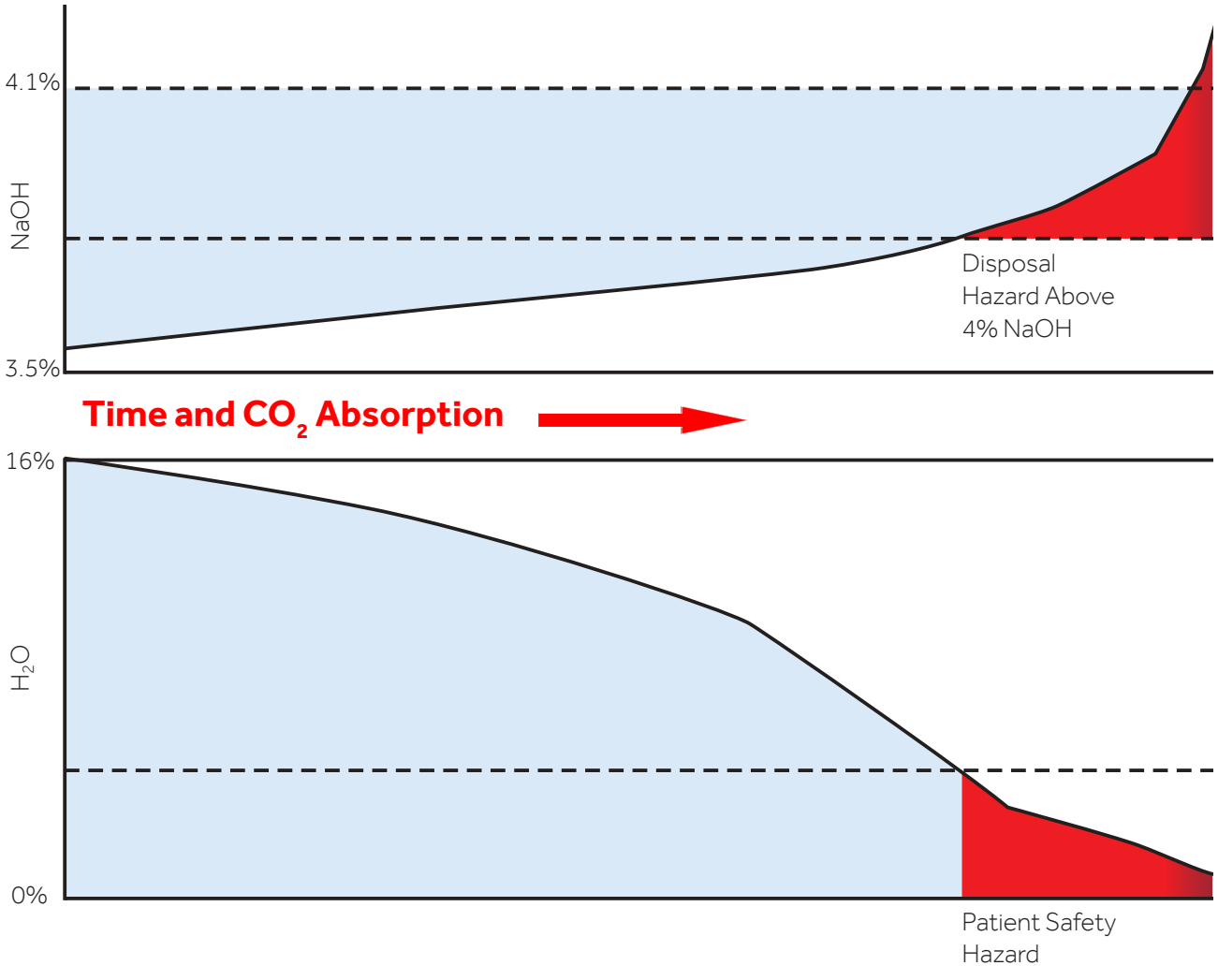
Manufacturers of absorbents cannot declare the pH of their material at any stage, as determination of pH requires the absorbent sample to be converted to a solution. Adding water to a sample of soda lime allows NaOH and $NaCO_3$ to dissolve in water, thus lowering the alkalinity of the material to provide a misleading pH value.

A declaration of pH for disposal of soda lime is inaccurate as it does not reflect the actual pH of the material. In some jurisdictions, alkalinity above certain thresholds requires special disposal methods to comply with environmental legislation.

AMSORB® Plus is free from strong base chemicals and therefore cannot become strongly alkaline. Disposal is with non-contaminated clinical waste for landfill.

Alkalinity Increases as Moisture Decreases

Progressive dehydration causes a 5-fold increase in the alkalinity of soda lime.



Desiccation

Retrograde Flow in Absorbents

AMSORB® Plus BUBBLE-CAN® UNIVERSAL

Gas flow desiccates all absorbents. Retrograde flow occurs when fresh gas flow is left running during non-use of an anaesthetic machine. Gas may pass over the top of the absorbent canister and desiccate the absorbent. In subsequent use of some absorbents, degradation of the anaesthetic agent may occur in conjunction with agent adsorption.

NaOH-containing absorbents will NOT change colour during gas flow desiccation. Instead they remain white but may be desiccated. Desiccated soda lime may absorb CO_2.

Colouration of AMSORB® Plus confirms desiccation. Desiccated AMSORB® Plus will not absorb CO_2. To avoid retrograde flow, fresh gas flow should be turned off during periods of non-use of the anaesthetic machine.

In addition to causing soda limes to become prematurely exhausted without the user's awareness, leaving the fresh gas flow on during periods of non-use is an extremely expensive practice regularly occurring in a significant percentage of hospitals. With AMSORB® Plus, coloration from retrograde flow alerts users to this expensive practice so they can devise protocols to reduce or eliminate its occurrence.

Background

Benefits of Prefilled Canisters

Prefilled canisters containing AMSORB® Plus offer convenience and user safety. They facilitate rapid 'switch-out' of exhausted material without interruption to mechanical ventilation. CO_2 accumulation in the breathing circuit can be avoided.

Absorbent Heat

Absorption of CO_2 by AMSORB® Plus produces heat. The amount of heat depends on rate of respiration, fresh gas flow rate and the shape and volume of the absorber canister. An increase in gas temperature does not reduce the efficiency of the reaction; in most cases it improves it. A peak temperature of 45°C may be observed with AMSORB® Plus. Such temperature has a positive effect on maintenance of core body temperature and mucociliary function during surgery.

Clinical reports show use of sevoflurane, in combination with certain desiccated absorbents, creates conditions for anaesthetic agent degradation to flammable by-products CO and HCOH as a precursor to extreme heat leading to fire in the absorber canister.

Struys *et al* reported that temperatures within an absorber canister of fresh or desiccated AMSORB® Plus did not exceed 40°C. Additionally, end-users have not reported elevated temperatures, nor have extensive in-house tests shown increased temperatures under any conditions. It logically follows that the chemical basis and sequelae for elevated temperature or fire is not possible when using AMSORB® Plus, given its chemical make-up and inability to degrade anaesthetic vapour.

Humidity Management in Breathing Circuits

Condensed water observed in the breathing system may originate from moisture in the patient's breath and from water produced by the exothermic reaction of absorption of CO_2. It may evaporate as the canister heats up and may condense on cooler parts of the apparatus. This is normal. A water trap can be used in the breathing circuit to collect water condensate. Alternatively, there may be a drainable water collection sump located on the absorber canister. This should be drained regularly.

Woehlck HJ. Sleeping with Uncertainty : Anesthetics and Desiccated Absorbent. Anesthesiology 2004; vol. 101; pp. 276-278

Laster M et al. Fires from the Interaction of Anesthetics with Desiccated Absorbent. Anesth Analg 2004; vol. 99; pp. 769-774

Castro BA et al. Explosion within an Anesthesia Machine: Baralyme®, High Fresh Gas Flows and Sevoflurane Concentration. Anesthesiology 2004; vol.101; pp. 537-539

Fatheree RS et al. Acute Respiratory Distress Syndrome after and Exothermic Baralyme®-Sevoflurane Reaction. Anesthesiology 2004; vol.101; pp. 531-533

Junzheng WU et al. Spontaneous Ignition, Explosion, and Fire with Sevoflurane and Barium Hydroxide Lime. Anesthesiology 2004; vol.101; pp. 534-537

Holak E J et al. Carbon Monoxide Production from Sevoflurane Breakdown: Modeling of Exposures Under Clinical Conditions. Anesthesia & Analgesia 2003; vol. 96: pp. 757-764

Struys MMRF et al. Production of compound A and carbon monoxide in circle systems: an in vitro comparison of two carbon dioxide absorbents. Anaesthesia 2004; vol. 59; pp. 584-589

Background

AMSORB® Plus and Bacteriostasis

Digestive enzymes of bacterial organisms such as MRSA and VRE are known to be susceptible to neutralisation by alkaline solutions. The weakly alkaline composition of AMSORB® Plus provides an inhospitable environment for such organisms. Use of a breathing filter at the patient-end of a breathing circuit is a useful adjunct in protecting patients from respiratory-borne infection. These filters provide a sufficient level of protection against infectious liquid- and air-borne organisms such as HIV, MRSA and VRE, as such organisms are more likely to be found in the tubing system, connecting the patient to the absorber system, than in the absorber itself. If AMSORB® Plus is intended to be used on a patient known to be infected with a contagious organism, the absorbent canister should be replaced before and after such use.

Disposal Considerations

Dispose of AMSORB® Plus as per the hospital's waste management programme for non-contaminated clinical waste. The material is safe to handle during its disposal. Unlike soda limes, AMSORB® Plus does not contain strong base chemicals. Therefore, the material is non-hazardous, making it suitable for landfill. It will break down into harmless compounds.

Storage Requirements

AMSORB® Plus does not deteriorate in storage when in sealed containers at ambient humidity above 15°C. If exposed to ambient air it will absorb CO_2 and lose moisture to the air; either of which will deplete hydration and cause colouration to appear. Prefilled canisters should be kept within outer box packaging until use as light can damage the colour indicator.

Guaranteed Unlimited Compatability

Armstrong Medical Limited guarantees the unlimited compatibility of AMSORB® Plus on anaesthesia machines in which loose-fill CO_2 absorbent is to be used or on those machines for which we provide a prefilled absorber canister.

Selection of Anaesthesia Machines

Manufacturer	Model/s	1.2 litre CARTRIDGES AMAB3201	CAN-CAN® AMAB3800	G-CAN® AMAB3801	BUBBLE-CAN® UNIVERSAL AMAB4001	CARE-CAN AMAB3803
Anmedic	Falcon, Kite				●	
Dräger Medical	Cato, Cicero, Fabius, Julian, Zeus				●	
Dräger Medical	Apollo, Primus, Pallas				●	
GE Healthcare	ADU II, Aliseo		●			
GE Healthcare	Aestiva, Excel, Modulus	●				
GE Healthcare	Aespire, Aisys, Avance, Amingo			●		
Mindray/ Datascope	AS3000	●				
Penlon	SP Prima	●				
Siemens	Kion	●				
Spacelabs	Frontline, Sirius	●				
GE Healthcare	Carestation™ 600 series					●

Many of the world's leading hospitals, universities and medical organisations use **AMSORB® Plus** because it is **safer**, **easier to use**, **better for the environment** and more **cost effective.**

Ask your **local representative** for a complete list.

Frequently Asked Questions

What are the advantages of using AMSORB® Plus over other available absorbents?

- Does not generate CO under any clinical conditions; does not generate Compound A or any like compounds when used with sevoflurane; does not generate HCOH or methanol when used with sevoflurane.
- Irreversible colour change, when fully exhausted; optimum CO_2 absorption; low resistance to gas flow; low dust levels with consistent granule size.
- Non-corrosive to skin.
- No secondary vaporization effect removes risk of complications/dangers including reduced narcosis or blood toxicity from excessive drug exposure (especially applicable to smaller, sensitive patients, i.e. children's hospitals).
- Permanent colour change eliminates possibility of accidentally using expired product.
- Dust is non-caustic and less harmful to techs breathing in dust during canister changes.
- Safe to handle during disposal.
- Better for the environment...unlike soda lime, is non-corrosive and safe for landfill where it breaks down into harmless inorganic compounds.
- Significant product savings due to ability to SAFELY use through to exhaustion ($FiCO_2$).
- Anaesthetic savings due to less adsorption of volatile anaesthetic.
- Anaesthetic savings due to lack of degradation.
- Anaesthetic savings due to ability to safely use lower flows.
- Waste and disposal savings due to ability to dispose of as non-hazardous waste.
- Time savings due to reduced frequency of canister changes.
- Significant cost savings due to reduced post-operative resource utilization, including nursing time, patient warming supplies, and time spent in post-operative unit.
- Significant cost savings due to elimination of all potential complications related to anaesthetic breakdown, including additional laboratory tests, hospital days, medical/legal expenses.
- Permanent colour change: increased user confidence and ability to reliably tell at a glance current state of product.
- Prefilled canisters available for all common anaesthesia machines mean hospitals can simplify their ordering and obtain all their absorbent from one source. Most hospitals purchase multiple different soda limes from different manufacturers because they have more than one type of anaesthesia machine.
- Ability to safely deliver low flow anaesthesia for extended time periods.
- Knowing exactly when to change eliminates guesswork, increases confidence, and decreases waste.
- Anaesthesia machines equilibrate faster, are less sluggish, and more accurately deliver desired drug percentages.
- Wealth of independently published peer reviewed literature is a great resource for end users (especially applicable to teaching hospitals).
- Granules reduce likelihood of gas channelling and optimise absorption performance.
- Dust is non-corrosive and not harmful to metal machine parts.
- Reduced instance of headache and PONV.

What anaesthetic agents can be used with AMSORB® Plus?

AMSORB® Plus can be used safely with anaesthetic agents halothane, enflurane, isoflurane, desflurane and sevoflurane. No fresh gas flow restrictions apply.

Why does AMSORB® Plus adsorb less anaesthetic vapour?

Completely desiccated AMSORB® Plus has least ability to adsorb anaesthetic vapour when compared to other absorbents (Knolle, 2002). Note that desiccated AMSORB® Plus is incapable of absorbing CO_2 and therefore will not be in clinical use.

When to cease using AMSORB® Plus?

This is determined by capnometry. The absorbent is changed when $FiCO_2$ has exceeded 0.5% volume or 5mmHg. CO_2 breakthrough to 0.5% volume or 5mmHg may be associated with colouration of 50% of the total height of the absorber canister.

Why change to **AMSORB®** Plus

AMSORB® Plus is the world's first CO_2 absorbent to be free of strong alkali. AMSORB® Plus offers significant clinical, cost and environmental advantage.

AMSORB® Plus is easier to use:
AMSORB® Plus retains its desiccated colour change. Available in prefill cartridges compatible with most common anaesthesia machine brands.

AMSORB® Plus is safer:
Unlike other absorbents, AMSORB® Plus is incapable of anaesthetic degradation and does not produce harmful by-products.

AMSORB® Plus is better for the environment:
AMSORB® Plus is free of strong-base chemicals, therefore, the material is non-hazardous, safe to handle during handling and disposal, and is suitable for landfill.

AMSORB® Plus is cost effective:
AMSORB® Plus demonstrates the least potential to delay inhalational induction at any flow rates. Mannion et al. 2011 demonstrated 25.7% annual anaesthetic gas savings.

AMSORB® Plus is designed for low flow anaesthesia:
AMSORB® Plus is safe for use at low and minimal flow rates. It will not adsorb anaesthetic agent and is not capable of agent degradation.

All Armstrong Medical products are manufactured to quality systems under ISO 13485 and EC Directive 93/42/EEC. For reliability, the properties of AMSORB® Plus must conform to carefully controlled parameters and this applies not only to the chemical composition but also to the size of granule, its moisture content and porosity.

Distributed by:

Armstrong manufacture a complete range of disposable respiratory products for anaesthesia and critical care applications. For supply of these products or any product within the Armstrong range, please contact your local representative.

Armstrong Medical

armstrongmedical.net

Armstrong Medical
Wattstown Business Park, Newbridge Road,
Coleraine, BT52 1BS, Northern Ireland.
T +44 (0) 28 7035 6029
F +44 (0) 28 7035 6875
info@armstrongmedical.net

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