Carbon Dioxide Absorbents

The complete choice

INTERSURGICAL®
COMPLETE RESPIRATORY SYSTEMS

Quality, innovation and choice

The Intersurgical absorbents range

The highest quality, the widest choice.

Intersurgical offer a choice of medical grade absorbents and standard soda lime to suit all of your clinical requirements. LoFlosorb®, Spherasorb® and Intersorb Plus® have been developed to the highest standard to ensure that you receive a product that delivers consistent performance. Intersurgical is committed to offering this quality, together with innovative solutions and the widest choice possible.

Our range of absorbents is different from some other brands because it has been developed in-house. Our state-of-the-art manufacturing facility allows us to control all aspects, from design and formulation right through to the manufacture. Technical expertise is on-hand to ensure you receive a safe, high quality product every time.

Safety First

Why is the choice of absorbent important?

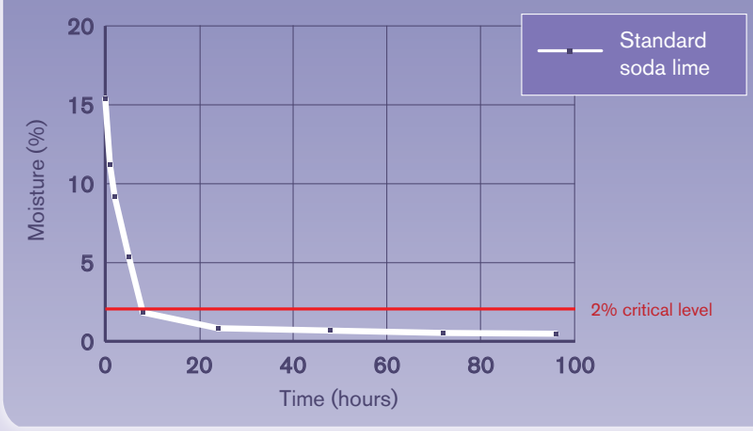
Conventional 'standard' Soda Lime absorbents have been used for many decades within anaesthetic re-breathing systems and have a good safety record. However, there are some safety considerations that have been raised.

There is a very low, but real risk of the absorbent drying out. If this happens, there is then the potential for unwanted interactions between the dry absorbent and the volatile anaesthetic leading to generation of chemical breakdown products and heat.

Spherasorb and LoFloSorb have been developed specifically to address such concerns and offer additional safety benefits compared with standard soda lime formulation.

Prolonged flows of dry oxygen at a number of litres per minute can excessively dry absorbents.

Drying curve. 400g of absorbent. 8 L/min oxygen flow (0% RH). Standard Soda lime.



The following points should be noted:

- These incidents are very rare.
- Reactions only occur when the absorbent is excessively dry. It is the alkali hydroxides (Potassium Hydroxide and Sodium Hydroxide) contained within the absorbent that reacts with the volatile anaesthetic.
- Normal use during anaesthesia does not cause excessive drying out. Various studies highlight that there have been very few reported incidents during anaesthesia over the years.
- Research and evidence from everyday use strongly suggest that only prolonged flows of dry oxygen/air at a number of L/min during periods of non-use cause excessive drying.
- The chemical formulation of the absorbent has an influence on the potential for reaction with the volatile anaesthetic, but only if excessive drying has already occurred.
- Rare cases have occurred in which thermal runaway causes an exponential rise in temperature to hundreds of degrees centigrade. Reactions at this temperature result in generation and ignition of hydrogen gas. These rare cases of thermal runaway are known to occur only with Potassium Hydroxide containing absorbents which are no longer widely available. There does not seem to be the 'thermal runaway' with dry Sodium hydroxide containing absorbents.
- Standard 3% Sodium Hydroxide absorbents when excessively dry can also react with volatile anaesthetics, however, a greater level of dryness is required and less heat and breakdown products are generated.

What is in our products?

	Spherasorb®	LoFloSorb®	Intersorb® Plus	Other Standard Soda Limes
Calcium Hydroxide	93.5%	92.5%	97%	97%
Sodium Hydroxide	1.5%	NIL	3%	3%
Silica *Synthetic/amorphous*	NIL	7.5%	NIL	NIL
Zeolite	5%	NIL	NIL	NIL
Indicator	0.03%	0.03%	0.03%	0.03%

NOTE: These are the dry constituents. All absorbents contain 13-17% water.

It is always recommended that colour change is used in conjunction with monitoring of Carbon Dioxide. The absorption of Carbon Dioxide is an exothermic reaction. All absorbents will generate heat, especially if exposed to higher than normal levels of Carbon Dioxide.

Safety information

All Intersurgical Carbon Dioxide absorbents are classified as Irritant only. This means they can be transported by road, air or sea as non-hazardous materials

Risk of serious damage to eyes.

Irritating to eye, respiratory system and skin.

Keep out of reach of children.

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Wear suitable gloves and eye/face protection.

In case of accident or if you feel unwell seek medical advice immediately and show label if possible.

Do not use if the product is damaged.

Do not flush with dry gas for long periods.

Do not use with trichloroethylene and chloroform.

Do not sterilize or disinfect the absorbent before use.

Do not use after expiry date.

Never allow pure carbon dioxide to pass through the canisters as the absorbent will generate high temperatures.

What is Spherasorb?

A unique medical grade soda lime designed specifically for clinical use.

Spherasorb's chemical formulation has been developed specifically to address the potential problems of use within the medical environment.

Features and Benefits

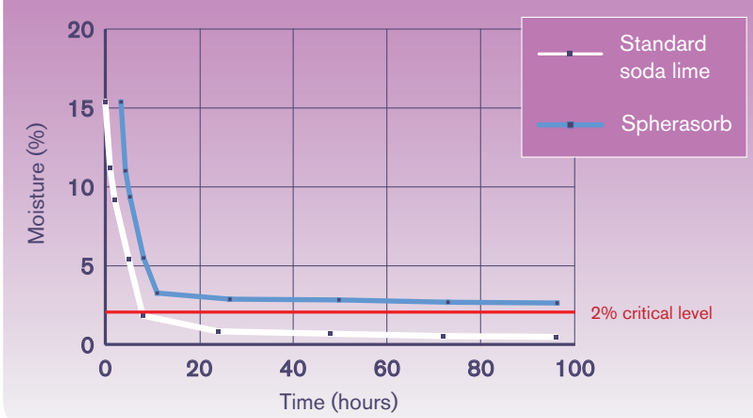
Only 1.5 % Sodium Hydroxide. Less than standard Soda Lime

Zeolite to reduce the risk of drying out. No other absorbents contain a zeolite.

Spherasorb is made of 3-4mm spheres processed to minimise potential dusting. Its uniform shape allows consistent bed packing, resulting in a more even flow of gases through the absorber and therefore, a very efficient absorption of CO_2.

Independent tests have shown that Spherasorb's unique formulation significantly reduces the risk of drying out and reaction as well as heat generation with volatile anaesthetic agents. Spherasorb exceeds the requirements of the United States Pharmacopia (USP).

Drying curve. 400g of absorbent. 8 L/min oxygen flow (0% RH). Spherasorb vs Standard Soda lime.



What is LoFloSorb?

A unique medical grade CO_2 absorbent that contains no Alkali Hydroxide.

LoFloSorb eliminates the risk associated with reactions with volatile anaesthetics.

Features and Benefits

LoFloSorb contains no Potassium Hydroxide and no Sodium Hydroxide. Therefore LoFLoSorb contains no aggressive chemicals that can react with the volatile anaesthetics.

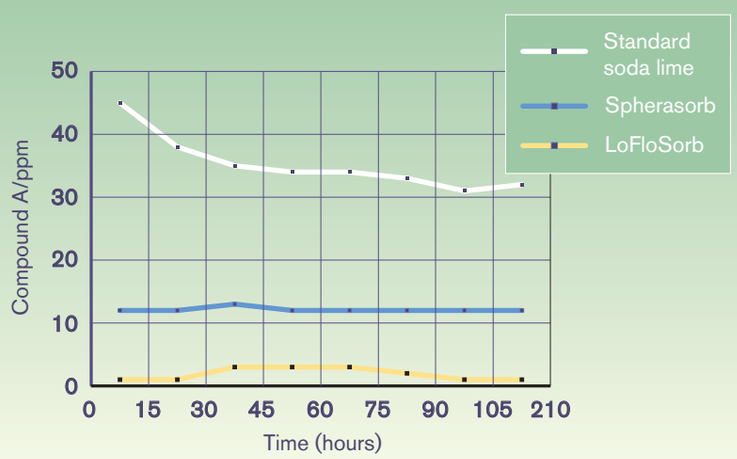
LoFloSorb is made of 3-4mm spheres processed to minimise potential dusting. Its uniform shape allows consistent bed packing, resulting in a more even flow of gases through the absorber.

LoFloSorb offers a very stable green to violet colour change. This eliminates the potential for exhausted product being mistaken for fresh.

Due to the absence of any Alkali Hydroxide LoFLoSorb does not last as long as standard soda limes or Spherasorb. LoFLoSorb meets all the requirements of the United States Pharacopia (USP).

Compound A is a breakdown product of Sevoflurane with dry absorbents. Independent tests have demonstrated that LoFloSorb eliminates the risk of reaction with Sevoflurane and other volatile anaesthetics.

LoFLoSorb eliminates the risk of reaction with Sevoflurane



What is Intersorb Plus?

Intersorb Plus is a conventional soda lime Carbon Dioxide absorbent comprised of short porous 3mm diameter strands.

Intersorb Plus is suitable for use within anaesthetic breathing systems. It is available in two indicator colour changes, pink to white and white to violet. Exhaustion of Intersorb Plus is clearly indicated by the colour change.

Features and Benefits

Intersorb Plus is made of 3mm strands. Its uniform shape allows for easy identification of Intersorb Plus.

Intersorb plus offers white to violet and pink to white colour change. This offers a clear indication as to when the product has become exhausted.

Intersorb Plus exceeds the requirements of the United States Pharmacopia (USP).

CO_2 Absorbents The choice is yours

Our range of medical grade absorbents and standard soda lime are available in a number of configurations to suit your requirements. These include loose fill, pre-filled absorbent cartridges and disposable absorbers for specific equipment.

Now it's easy to choose your absorbent online

Visit **www.intersurgical.com/info/absorbents** and match your machine and model to one of our canisters or loose fill options.

Spherasorb® A unique medical grade soda lime designed specifically for clinical use. Spherasorb's chemical formulation has been developed specifically to address the potential problems of use within the medical environment.

LoFloSorb® A unique medical grade CO_2 absorbent that contains no Alkali Hydroxide. LoFloSorb eliminates the risk associated with reactions with volatile anaesthetics.

Intersorb Plus® A conventional soda lime Carbon Dioxide absorbent comprised of short porous 3mm diameter strands. Intersorb Plus is only available in loose fill 5 litre jericans.

www www.intersurgical.com/info/absorbents

Loose fill options

1kg packages or 5 litre jerican

Code	2179	2180	2175	2173	2174	2172	2178
Box qty.	2	2	2	10	2	10	2
Absorbent	Intersorb Plus	Intersorb Plus	Spherasorb	Spherasorb	Spherasorb	Spherasorb	LoFloSorb
Pack type	5L Jerican	5L Jerican	5L Jerican	1kg Bag	5L Jerican	1kg Bag	5L Jerican
Colour change	White to Violet	Pink to White	White to Violet	White to Violet	Pink to White	Pink to White	Green to Violet

The Drum®

1kg pre-filled absorbent cartridge

The Drum is an easy to use, pre-filled 1kg absorbent cartridge that has been developed specifically for clinical use during anaesthesia. Its shape and dimensions follow an established conventional design.

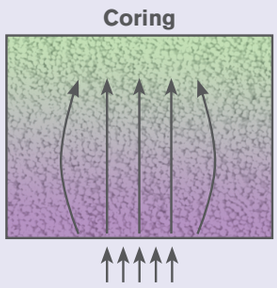
However The Drum's unique central baffle and dispersion channels allow for greater utilisation of the soda lime.

The Drum can be used on all anaesthetic machines with single or double absorbers that have been designed to take a conventional pre-filled cartridge.

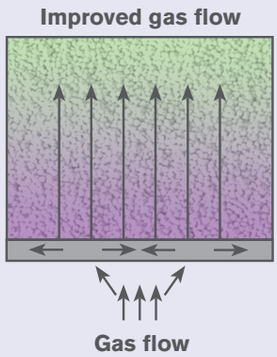
Quick and convenient exchange of absorbent
The Drum eliminates the time consuming task of pouring loose granules into the absorber and removing when exhausted.

Choice of three Intersurgical absorbents
The Drum is available filled with LoFloSorb, Spherasorb or Intersorb Plus.

Standard cartridge



The Drum



Unique design with central baffle and dispersion channels

Reduced channelling and coring
With The Drum optimum flow and dispersion is achieved resulting in a better utilisation of the soda lime granules and a more visible colour change from the outside.

Ordering information

Code	2186	2187	2188
Box qty.	10	10	10
Absorbent	Spherasorb	Spherasorb	LoFloSorb
Colour change	White to Violet	Pink to White	Green to Violet

The Pyramid®

1kg pre-filled disposable carbon dioxide absorber

The Pyramid is an easy to use disposable absorber specifically developed for clinical use during anaesthesia to absorb CO_2 within an anaesthetic breathing system. The Pyramid is compatible with the following Draeger anaesthetic workstations: Cicero EM® Cato edition® Fabius CE® Fabius GS® Julian® Primus® Zeus®

The Pyramid can only be used on the above Draeger workstations if they have been fitted with the Draeger CLIC adaptor.

It is essential that the user:

- Follows the instructions for use of the Draeger anaesthetic workstation concerned.
- Refer to the instructions for use supplied with each box of Intersurgical Pyramid absorbers.

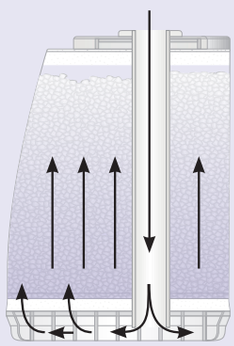
Air-tight cap
Provides a seal to protect the absorbent from moisture and carbon dioxide within the air.

Compatible with the Draeger CLIC adaptor
Enables fast exchange of absorbent with minimal interruption of absorption Eliminates the need to pour loose granules and significantly reduces dust emission.

No dust emissions
Foam filters prevent fine particles of dust escaping from The Pyramid into the breathing system.

Gas dispersion chamber

Provides optimum flow and dispersion, resulting in a better utilisation of the soda lime granules and a more visible colour change.



Ordering information

Code	2191	2192	2193
Box qty.	6	6	6
Absorbent	Spherasorb	Spherasorb	LoFloSorb
Colour change	White to Violet	Pink to White	Green to Violet

IS Pac

0.5kg pre-filled disposable carbon dioxide absorber

The IS Pac is an easy to use disposable absorber that has been developed specifically for clinical use during anaesthesia to absorb carbon dioxide within an anaesthetic breathing system.

The IS Pac is designed to be used on both the Anmedic Q Block and GEH (ADU) Compact Block®

Before using the IS Pac it is essential to do the following:

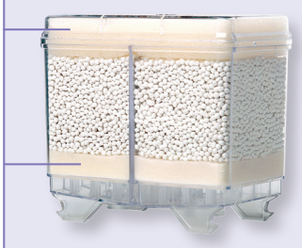
- Become familiar with and follow the Instructions for use of the anaesthetic workstation concerned.
- Refer to the Instructions for use supplied with each box of Intersurgical IS Pac canisters.

Airtight seals for storage

The IS Pac is fitted with airtight caps to protect the absorbent from moisture and carbon dioxide within the air.

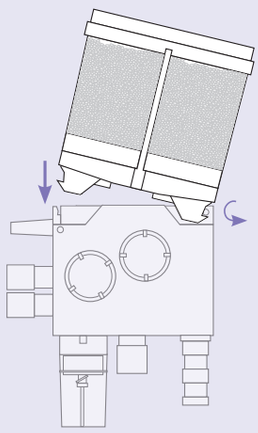
No dust emission

Foam filters ensure that any fine particles or dust are retained within the IS Pac and not allowed to escape into the breathing system or into the atmosphere during handling, therefore, providing a safe solution for the user.



Fast and easy exchange

The IS Pac enables fast exchange of absorbent without the need for time consuming pouring of loose granules, or the risk of contamination.



Ordering information

Code	2183003	2183004	2183005
Box qty.	10	10	10
Absorbent	Spherasorb	Spherasorb	LoFloSorb
Colour change	White to Violet	Pink to White	Green to Violet

IS Can

1kg pre-filled disposable carbon dioxide absorber

The IS Can is an easy to use disposable absorber that has been developed specifically for clinical use during anaesthesia to absorb carbon dioxide within an anaesthetic breathing system.

The IS Can is compatible only with the following GE anaesthetic workstations: Aespire®, Avance®, Aisys®, ADU®

Before using the IS Can it is essential to do the following:

- Become familiar with and follow the Instructions for use of the anaesthetic workstation concerned.
- Refer to the Instructions for use supplied with each box of Intersurgical IS Pac canisters.

Fast and easy exchange
The IS Can enables fast exchange of absorbent without the need for time consuming pouring of loose granules, or the risk of contamination.

No dust emission
Foam filters ensure that any fine particles or dust are retained within the IS Can and not allowed to escape into the breathing system or into the atmosphere during handling.

Efficient CO_2 absorption
A gas dispersion chamber at the base of the IS Can allows for optimum flow up through the absorbent.

Ordering information



Code	2196	2197	2198
Box qty.	6	6	6
Absorbent	Spherasorb	Spherasorb	LoFloSorb
Colour change	White to Violet	Pink to White	Green to Violet

Which product fits your machine?

Draeger® compatibility guide

Draeger®	Loose fill	Drum	Pyramid	IS Pac	IS Can
Zeus with CLIC adaptor	-	-	✓	-	-
Zeus with refillable absorber	✓	-	-	-	-
Primus/Apollo with CLIC adaptor	-	-	✓	-	-
Primus/Apollo with refillable absorber	✓	-	-	-	-
Fabius Tiro with CLIC adaptor	-	-	✓	-	-
Fabius Tiro with refillable absorber	✓	-	-	-	-
Fabius GS with CLIC adaptor	-	-	✓	-	-
Fabius GS with refillable absorber	✓	-	-	-	-
Fabius CE with CLIC adaptor	-	-	✓	-	-
Fabius CE with refillable absorber	✓	-	-	-	-
Julian with CLIC adaptor	-	-	✓	-	-
Julian with refillable absorber	✓	-	-	-	-
Cicero with CLIC adaptor	-	-	✓	-	-
Cato with refillable absorber	✓	-	-	-	-
Cicero with CLIC adaptor	-	-	✓	-	-
Cato with refillable absorber	✓	-	-	-	-
All above are registered trademarks of Draeger Medical					
Narkomed 2B	✓	✓	-	-	-
Narkomed 4	✓	✓	-	-	-
Narkomed GS	✓	✓	-	-	-
Narkomed Mobile	✓	✓	-	-	-
Other	✓	-	-	-	-

GE Healthcare® compatibility guide

GE Healthcare®	Loose fill	Drum	Pyramid	IS Pac	IS Can
Aisys using the pre-filled Multiabsorber	-	-	-	-	✓
Aisys using the refillable Multiabsorber	✓	-	-	-	✓
Avance using the pre-filled Multiabsorber	-	-	-	-	✓
Avance using the refillable Multiabsorber	✓	-	-	-	✓
Aespire reusing the pre-filled Multiabsorber	-	-	-	-	✓
Aespire using the refillable Multiabsorber	✓	-	-	-	✓
ADU using the pre-filled Compact absorber	-	-	-	✓	✓
ADU using the refillable Compact absorber	✓	-	-	✓	✓
Aestiva	✓	✓	-	-	-
Excel	✓	✓	-	-	-
Modulus	✓	✓	-	-	-
All above are registered trademarks of GE Healthcare					
Other	✓	DoM	-	-	-

DoM - Depends on Machine

Maquet® (formerly Siemens®) compatibility guide

Maquet®	Loose fill	Drum	Pyramid	IS Pac	IS Can
Kion-i	✓	✓	-	-	-
Flow-i	DoM				
All above are registered trademarks of Maquet					
Other	DoM	-	-	-	-

Spacelabs® compatibility guide

Spacelabs®	Loose fill	Drum	Pyramid	IS Pac	IS Can
Focus	✓	✓	-	-	-
Frontline	✓	✓	-	-	-
All above are registered trademarks of Spacelabs					
Sirius	✓	✓	-	-	-
Other	✓	DoM	-	-	-

Penlon® compatibility guide

Penlon®	Loose fill	Drum	Pyramid	IS Pac	IS Can
A100	✓	✓	-	-	-
SP100	✓	✓	-	-	-
SP200	✓	✓	-	-	-
Other	✓	DoM	-	-	-
Other manufacturers	DoM	DoM	DoM	DoM	DoM

DoM - Depends on Machine

References

Carbon monoxide formation in five soda lime brands with different content of alkali hydroxides
Knolle E*, Gilly H. Department of Anesthesiology and General Intensive Care (B), University of Vienna, Austria.

Carbon monoxide production from desflurane, enflurane, halothane, isoflurane, and sevoflurane with dry soda lime.
Wissing H, Kuhn I, Warnken U, Dudziak R. Clinic of Anesthesiology, ICU and Pain Therapy, University Hospital. Frankfurt, Germany.

Carbon Monoxide Production from Degradation of Desflurane, Enflurane, Isoflurane, Halothane and Sevoflurane by Soda Lime and Baralyme.
E I Eger et al. University of California.

Dry Soda Lime markedly degrades sevoflurane during simulated inhalation induction.
W Funk et al. University of Ragensburg.

Anaesthesist 1997 Dec. 46(12):1050-3 [Interactions of dry soda lime with sevoflurane and enflurane. Clinical report on two unusual anesthesias
Janshon GP, Dudziak R. Zentrum der Anaesthesiologie und Wiederbelebung, Klinikum der Johann-Wolfgang-Goethe-Universitat Frankfurt am Main.

Frink E et al. High Carboxyhemoglobin concentrations occur in swine during Desflurane anaesthesia in the presence of partially dried carbon dioxide absorbents:
Anesthesiology 8792 : 308-316 August 1997.

Comportamiento en clinica de dos tipos de cal sodada estudio comparativo.
Hospital Clinico Anestesia. Blasco Ibanez 17.46010 Valencia.

Dr Harvey Woehlck, Professor of Anaesthesiology, Medical College of Wisconsin. APSF conference, Chicago 27th April 2005. Article soon to be presented to the ASA for publication.

Further reading

Spherasorb reduces the risk of drying out:
Hospital Clínico. Anestesia. Blasco Ibañez 17. 46010 VALENCIA

Spherasorb reduces the potential for reaction with Sevoflurane compared with standard soda lime:
Institut for Experimentalle Anasthesiologic Johann Wolfgang Goethe Universitat.
University of Wales, Cardiff, UK

Spherasorb reduces the potential for Carbon Monoxide generation compared with standard Soda Limes.
University of Vienna, Austria.
University Medical Center, Amsterdam.

Spherasorb offers one of the highest capacities for carbon dioxide absorption.
University of Dusseldorf.
Medical College of Wisconsin.

LoFloSorb eliminates the potential for reaction with Sevoflurane:
Institut for Experimentalle Anasthesiologic Johann Wolfgang Goethe Universitat.
University Medical Center, Amsterdam, UK

LoFloSorb reduces the potential for Carbon Monoxide generation to negligible levels.
University of Vienna, Austria.
University Medical Center, Amsterdam.

LoFloSorb offers a stable colour change and so reduces the chances of exhausted product being mistaken for fresh.
Département d'Anesthésie-Réanimation. CHU de Poitiers. France

More quality, innovation and choice **available online**

www.intersurgical.com/info/absorbents

Visit our website

We have made significant changes to make a better online experience for visitors to our web site. It's now much easier to navigate around and find what you want. The product images are bigger and better and we've also added educational video clips and literature downloads which provide useful tools for educators and clinicians in respiratory care.

International site: www.intersurgical.com

YouTube

We also have a YouTube channel which offers the full library of video clips for you to look at and share: **www.youtube.com/intersurgical**

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