


<b>ATRASORB INDUSTRIA DE PRODUTOS HOSPITALARES LTDA</b> Avenida Piracicaba, 351, Vila Nova São Roque - 18131-230, São Roque-SP, Brazil, Phones: + 55 11 5521-2076 CNPJ: 05.691.570/0004-31 - Registration. State: 653.066.864.115 email: <a href="mailto:atrasorb@atrasorb.com.br">atrasorb@atrasorb.com.br</a>			 Absorvedores de CO <sub>2</sub> <b>Atrasorb DEFENSE 230</b>	
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## 1 – Product

### Carbon dioxide absorber in pills - **Atrasorb DEFENSE 230**

#### Indications

CO<sub>2</sub> absorber in pills and for use in Submarines.

## 2 – Composition / Specification

### 2.1 Chemical Composition

CAS 1305-62-0 – Calcium Hydroxide (hydrated lime) - Chemical formula: Ca(OH)<sub>2</sub>

CAS 1310-73-2 – Sodium Hydroxide - Chemical formula: NaOH

CAS 1310-58-3 – Potassium Hydroxide - Chemical formula: KOH

Water - Chemical formula: H<sub>2</sub>O

### 2.2 Physicochemical characteristics

- Grain size: (2.00 to 4.75 mm): average 4.5 mm
- Grain shape: semi-spherical pills
- Humidity: 12 to 23% (depending on the application)
- Color: white to slightly yellowish or grayish
- Post-saturation indicator: does not contain indicator

## 3 – Product Description

### Atrasorb DEFENSE 230 CO<sub>2</sub> absorbers

Chemical compound used as a filter for absorbing CO<sub>2</sub> in submarines.

Its semi-spherical shape provides better compaction in the reservoir and consequently a larger CO<sub>2</sub> absorption area, in addition to preventing the formation of dust.

When used in filters, whether combined or not, they enable the reuse of expired gases without rebreathing Carbon dioxide (CO<sub>2</sub>) through a chemical filtration process.

They have a limited useful life, after which they must be replaced so that the user does not rebreathe CO<sub>2</sub>.

They have a moisture composition between 12 and 23% H<sub>2</sub>O (depending on the application). Its degree of hardness allows safe transportation, preventing the formation of dust.

The packaging of the products (Navy cartridges) are sealed and hermetically closed, guaranteeing their moisture content, enabling the product to be guaranteed for 5 years.


#### Presentation forms

The packaging consists of Plastic Containers (available in quantities of 1.0, 4.0, 4.3, 4.5, 5.0, 15.0, 18.0, 20 and 134 kg), with a product identification label (DEFENSE 230).

## 4 – Instructions for Use

4.1 - Atrasorb **DEFENSE 230** has been tested in accordance with NATO STANDARD ADivP-03 and Defense Standard DS 68-166-1, standards for submarines and diving.

The packaging in which it is contained ensures that compliance with the requirements of these standards is maintained, while unopened, for five years from the date of manufacture. However, once the packaging is opened, it is the responsibility of the user/dealer/owner to ensure that the product is used on the appropriate equipment and in an appropriate manner, in accordance with the instructions for use provided by the manufacturer of the respective

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equipment. Atrasorb, manufacturer of CO<sub>2</sub> absorbers cannot and will not assume responsibility for incorrect use or storage, or products that have passed their expiration date.

4.2 - The average time of use is approximately 9 (nine) hours per kilogram of the product (test carried out with an air flow of 10 liters/minute with 4% CO<sub>2</sub> in volume, up to 1.0% CO<sub>2</sub> in effluent air). The exchange must be made according to the Submarino's CO<sub>2</sub> index reading equipment. If there is an indication of the CO<sub>2</sub> (carbon dioxide) content in the air flow, the change takes place when the index reaches the level of 0.1 to 1% of CO<sub>2</sub> (Depending on application).

4.3 - Control can be done by recording the time of use or by the maximum application rate in the air flow if measurement is available.

4.4 - Once the maximum filtration limit has been reached, the product must be removed from the reservoir and discarded (see FISPQ – Chemical Product Safety Information Sheet).

4.5 - After opening the packaging, it is recommended that it be used within a maximum of 30 days and that the container remains protected from heat and light (preferably stored in the box itself). After this period, it must be discarded (see MSDS – Chemical Product Safety Information Sheet).

4.6 - After filling the reservoir (Navy Cartridge) until its effective use, we inform you of the following:

a) the normal procedure is to fill the reservoir and use it immediately.

b) when its immediate use does not occur, its duration (CO<sub>2</sub> absorption capacity) will depend on factors such as:

- room temperature;
- incidence of luminosity and solar rays;
- equipment sealing;
- loss of moisture from the product, which significantly interferes with the absorption capacity and
- quality of inhaled air.

#### **ATTENTION!**

The absorption capacity is measured in liters of CO<sub>2</sub> absorbed (according to item 4.2), which is approximately 210 liters per kilogram.

Never use absorbent packaging to store used Atrasorb DEFENSE 230, nor mix new absorber with used absorber.

#### **c) Considerations about the CO<sub>2</sub> Absorber Element**

- When changing the humidity of the CO<sub>2</sub> Absorber Element to levels lower than those specified by the manufacturer, some undesirable reactions may be produced, independent of the type of CO<sub>2</sub> Absorber being used, such as:

- reduction in CO<sub>2</sub> absorption capacity;
- rebreathing of CO<sub>2</sub> by the user;
- increased heat generation in the CO<sub>2</sub> Absorber Element which in turn causes an increase in the temperature of the gas breathed by the patient.

ATRASORB recommends replacing the CO<sub>2</sub> Absorber Element if the equipment remains unused for a period of 7 days or more (see item 4.6 of this Instruction).

#### **ATTENTION!**

CO<sub>2</sub> Absorber Element contains alkaline hydroxides and can cause irritation to the eyes, skin and respiratory system. When replacing the CO<sub>2</sub> Absorber Element, be careful not to spill it.














- 1) Empty the reservoir with the used CO<sub>2</sub> Absorber Element, in an appropriate location;
- 2) Fill the reservoir only with a new CO<sub>2</sub> Absorber Element;

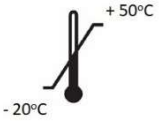


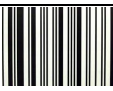
3) Make sure that when closing the filled reservoir, there is no dust or CO<sub>2</sub> Absorber Element particles preventing the system from sealing.

#### Personal protection measures

- Skin/eye protection: Well-fitting safety glasses
- Hand protection: Glove substance: Nitrile rubber - Glove thickness: 0.11 mm
- Respiratory protection - Necessary in case of dust formation: Recommended Filter Type: PFF2 Filter

### 5 – Symbol table

	Manufacturer
	Manufacturing date
	Expiration date
	Non-sterile
	Batch
	Do not reuse
	Fragile, handle with care
	See instructions for use
	Corrosive. May cause burns severe skin and eye damage
	Careful
	Causes skin sensitization and skin and eye irritation
	Correct stacking direction
	Maximum stacking

	Storage Temperature Range
	Protect against moisture
	Protect against heat
	bar code

## 6 – Manufacturer data



Atrasorb Industria de Produtos Hospitalares Ltda

**Address:** Avenida Piracicaba, 351 – Vila Nova São Roque

**City:** São Roque-SP

**CNPJ:** 05.691.570/0004-31

**Contact:** +55 11 5521-2076

**Email:** [atrasorb@atrasorb.com.br](mailto:atrasorb@atrasorb.com.br)

## 7 - Other information

More information about the product (risks, protective and first aid measures, handling, storage, etc) can also be found in the product's MSDS (Chemical Product Safety Information Sheet) and at [www.atrasorb.com.br](http://www.atrasorb.com.br).