Inhalation systems for aerosol therapy

The confidence in respiratory care
Introduction to topical inhalation therapy

Compressor aerosol units and nebulizers for topical treatment

Devoted to customers’ satisfaction, our mission is to improve the quality of patients’ life affected by respiratory pathologies concentrating our research on efficient and non-invasive technologies to offer both doctors and patients reliable and effective devices, easy to use and respecting the environment.

Believing in the benefits of aerosol therapy as topical treatment, our company is the first one to develop two separate nebulizers for the targeted treatment of the upper and lower airways.

We create nebulizers aiming to guarantee all the patients, both children and adults, the following advantages from topical inhalation therapy, considered the most effective method for respiratory diseases:

Topical treatment using a specific nebulizer allows drug deposition directly in the target organ.

The local administration of reduced doses of drug avoids the problem of systemic side effects and makes the treatment more effective.

Topical treatment is normally well tolerated and more than one drug can be atomized simultaneously if prescribed.

Key-words in aerosoltherapy

Here you are some frequent definitions in aerosol therapy.

**Aerosol**
Suspension of liquid particles in a gas.

**Nebulizer**
A device that converts a liquid into an aerosol.

**Aerosol device**
A device comprised of a nebulizer and an electromechanical part that converts a liquid into an aerosol and makes it available for inhalation.

**Airways**
The body’s natural ducts through which air is conveyed to the pulmonary alveoli.

**Atomization**
The reduction of a substance into particles around thousandths of a millimetre in diameter, expressed in microns (μm).

**Atomization efficacy**
The ability of the aerosol device to convert a given volume of liquid into micronized particles.

**Dynamic pressure**
The output pressure generated by the nebulizer, generally expressed in bars. This parameter is influenced by the power source and dimensional factors.

**Dynamic flow or dynamic capacity**
The rate of air flow generated by the nebulizer, in litres per minute (l/min). This parameter is influenced by the power source and dimensional factors.

**Output or rate of flow**
The quantity of aerosol delivered by the system in a unit of time.

**Maximum filling volume**
The maximum volume of liquid that the base of the nebulizer can hold, expressed in millilitres (ml) or cubic centimetres (cc).

**Residue**
The amount of un-atomized drug remaining in the nebulizer at the end of treatment.

**Mean Mass Aerodynamic Diameter (MMAD)**
This parameter indicates the ability of the nebulizer to produce small size particles, which are necessary for the treatment to be effective. The diameter of 50% by volume of the particles atomized by the nebulizer is lower than the MMAD, the remaining 50% is higher than the MMAD.
Rinowash Micronized nasal douche

Connected to a compressor aerosol unit, it is ideal for treating rhinitis, rhinosinusitis, nasal polyposis, adenoiditis and tubo-tympanitis using drugs or SPA water, saline and physiological solutions, it enhances deposition in the upper airways as it produces particles with a MMAD of 18 μm.

- Convenient and compatible with all compressor aerosol units
- Atomizes 5 ml solution in 2 minutes
- Usable as from a very early age, with no contra-indications
- A special patented internal valve controls the output pressure in the nasal cavities to prevent the risk of barotraumas.

Rinowash Solution

Hypertonic saline solution, ideal for flushing out the nasal cavities.

Thanks to its osmotic action, the use of Rinowash saline solution with the micronized nasal douche is associated with greater improvement in nasal patency or and oedema reduction.

Please see instructions manual for any additional information
Volumetric masks and nebulizers

Nebula Spacer

Nebula Spacer is studied for broncopulmonary apparatus taking care of bacterial or viral infections, asthma, bronchitis, pneumonia, cystic fibrosis. Connected to a compressor aerosol unit, Nebula Spacer guarantees an efficient therapy in a shorter time (2’ to nebulize the complete therapeutic dose).

* Universal and functioning with all compressor aerosol units
* Ideal for cooperating patients
* Guarantees bronchial deposition of the atomized drug as it produces particles of the right size (1 - 5 microns)
* The ergonomic shape increases the patients’ comfort during therapy

Perfecta

Perfecta delivers the drug straight into the lower airways, and the whole treatment only takes two minutes to nebulize the prescribed dose.

Producing very small particles ideal for treating pathologies affecting the lower respiratory tract: bacterial or viral infections, asthma, bronchitis, pneumonia, cystic fibrosis.

The special shape of the mask and the soft material make it suitable for very young children who are not cooperative, covering both mouth and nose.

* Universal and functioning with all compressor aerosol units
* Producing particles sized 1-5 microns, it is suitable for the lower airways
* Easily tolerated by users of any age, it reduces side effects and enhances therapy effectiveness

Rinowash, Perfecta and Nebula Spacer are available as separate devices (to be connected to compressor aerosol units) and also supplied with our aerosol units Nebula, Mobyneb, Soffio Plus. Information about these units are in the pages here-on. They are the result of our constant research in providing an effective and safe method of performing inhalation therapy.
Nebula is the result of 30 years in scientific research and technology in order to guarantee professional products with a specific therapeutical action. Each component part is made of shock-resistant material and is designed to make it easy to use, reliable and safe, and to ensure excellent performance at all times.

Nebula aerosol therapy unit comes with two special nebulizers that convey the drug straight to the parts to be treated: Rinowash, designed specifically for the upper airways, and Nebula Spacer for the bronchopulmonary apparatus.

Nebula is equipped with a complete kit containing: Nebula Spacer, Rinowash, paediatric mask, spare air filters and air tubing.

- Effective: complete treatment of upper and lower airways
- High performance ensuring safe therapy
- Increase of the peripheral deposition
- Reduction of drug dispersal to a minimum
- Reduced therapy time
- Longer durability and higher robustness

**Rinowash**
Micronized nasal douche for the treatment of upper airways. It atomizes particles of an ideal size for treating the nasal cavities.

**Nebula Spacer**
Nebulizer with volumetric mouth mask. Improves efficacy of treatment, increases deposit of the nebulized drug.

Please see instructions manual for any additional information.

### TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Rinowash</th>
<th>Nebula Spacer</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMAD</td>
<td>18 μm (*)</td>
</tr>
<tr>
<td>Output rate</td>
<td>2 ml/min</td>
</tr>
<tr>
<td>MMAD</td>
<td>1.9 μm</td>
</tr>
<tr>
<td>Output rate</td>
<td>0.3 ml/min</td>
</tr>
</tbody>
</table>

- Operation: Continuous
- Maximum air pressure: 2.7 bar
- Maximum air flow: 12 l/min
- Noise level at 1 m: 57 dBA (to UNI EN 13544-1)
- Dimensions of the basic unit: 230x180x185H mm
- Weight of the basic unit: 3 kg

(*) The values shown refer to the use of physiological solution (0.9% NaCl) and may vary with the drug used. The values given do not apply to drugs in suspension or high-viscosity drugs. The manufacturer of the drug can provide the necessary details.
MobyNeb features Perfecta nebulizer with volumetric oro-nasal mask for children but suitable also to adults, as well as Rinowash, both successfully used to treat localized diseases of the lower and upper airways.

Mobyneb was the first device in Italy to incorporate the innovative concept of topical inhalation therapy, which facilitates drug deposition in the target organ.

Mobyneb is comprised of the following accessories: power unit, Perfecta volumetric mask, Rinowash nasal douche, mouth piece, air tubing and spare air filters.

- Friendly design allowing an easier treatment for children
- Safe and effective treatment of the lower airways
- Increase of the drug deposition where it is needed with reduced side effects
- Reduction of drug dispersal to a minimum
- Reduced therapy time
- Longer durability and higher robustness

Perfecta is especially designed for treating the lower airways of young children. Allows high deposition of the atomized drug.

Rinowash allows physiological and/or medical treatment of the nasal cavities. A jet of atomized solution helps to enhance hydration and fluidification of the mucus and catarrh, hence their removal. Very useful for babies not yet able to blow their nose.

Please see instructions manual for any additional information.

## TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th></th>
<th>Rinowash</th>
<th>Kit Perfecta</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMAD</td>
<td>18 μm</td>
<td>1.9 μm</td>
</tr>
<tr>
<td>Output rate</td>
<td>2 ml/min</td>
<td>0.3 ml/min</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
</tr>
<tr>
<td>Maximum air pressure</td>
</tr>
<tr>
<td>Maximum air flow</td>
</tr>
<tr>
<td>Noise level at 1 m</td>
</tr>
<tr>
<td>Dimensions</td>
</tr>
<tr>
<td>of the basic unit</td>
</tr>
<tr>
<td>Weight</td>
</tr>
<tr>
<td>of the basic unit</td>
</tr>
</tbody>
</table>

(*) The values shown refer to the use of physiological solution (0.9% NaCl) and may vary with the drug used. The values given do not apply to drugs in suspension or high-viscosity drugs. The manufacturer of the drug can provide the necessary details.
**Soffio Plus** Compressor aerosol unit for children and adults

It is extremely **compact** and very **practical**. Light and small in size, its design has been studied to obtain essential shape and durable casing, **easy to handle and to clean**. A very practical shoulder bag facilitates any transport needs.

Soffio Plus comes with **Perfecta volumetric oro-nasal mask** specific for children but suitable also to adults and it is used for the treatment of **lower airways diseases**.

---

**Perfecta**


---

**TECHNICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Kit Perfecta</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MMAD</td>
<td>1.9 μm</td>
</tr>
<tr>
<td>Output rate</td>
<td>0.3 ml/min</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>Continuous</td>
</tr>
<tr>
<td>Maximum air pressure</td>
<td>2.5 bar</td>
</tr>
<tr>
<td>Maximum air flow</td>
<td>12 l/min</td>
</tr>
<tr>
<td>Noise level at 1 m 59.3 dBA (to UNI EN 13544-1)</td>
<td></td>
</tr>
<tr>
<td>Dimensions of the basic unit</td>
<td>190x130x120H mm</td>
</tr>
<tr>
<td>Weight of the basic unit</td>
<td>1.5 kg</td>
</tr>
</tbody>
</table>

(*) The values shown refer to the use of physiological solution (0.9% NaCl) and may vary with the drug used. The values given do not apply to drugs in suspension or high-viscosity drugs. The manufacturer of the drug can provide the necessary details.

---

**Soffio Plus** means full comfort at any conditions: it is the ready to use solution helping patients to get their aerosol treatment everywhere.

- Effective treatment of lower airways
- Increase of the peripheral deposition with limited side effects
- Reduction of drug dispersal to a minimum
- Compact, light, stylish design granting ease of handling and cleaning
- Shoulder bag included
New Voyage  Compressor aerosol unit for “on the way” patients

Innovation and tradition are combined in a device that features a **stylish new design** reflecting the consistently high level of quality of Air Liquide Medical Systems’ products. New Voyage aerosol unit is used for the treatment of **lower airways diseases**.

**Ergonomically-designed** and easy to carry; portable and ideal for transport. New Voyage is equipped with: Mefar 2000 nebulizer plus mouthpiece, a paediatric mask, an adult mask, a connecting tube.

**Mefar 2000**

Breathe enhanced nebulizer to ensure optimal delivery of the drug.

The micronized particles have the right MMAD (*) to aid deposition in the lower airways.

```
- Effective; adequate bronchial deposition in a short time
- Extremely convenient; very good relation between price and quality
- Handy, lightweight unit simplifies therapy and can be used anywhere, anytime.
- Accessories compartment made of smooth, non-porous material for easy cleaning.
```

**NEW VOYAGE SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Kit Mefar 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMAD</td>
</tr>
<tr>
<td>Output rate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
</tr>
<tr>
<td>Maximum air pressure</td>
</tr>
<tr>
<td>Maximum air flow</td>
</tr>
<tr>
<td>Noise level at 1 m</td>
</tr>
<tr>
<td>Dimensions of the basic unit</td>
</tr>
<tr>
<td>Weight of the basic unit</td>
</tr>
</tbody>
</table>

(*) The values shown refer to the use of physiological solution (0.9% NaCl) and may vary with the drug used. The values given do not apply to drugs in suspension or high-viscosity drugs. The manufacturer of the drug can provide the necessary details.

Please see instructions manual for any additional information
Valved holding chambers for inhalers

**L’espace**

Worldwide guidelines recommend the use of the spacer chamber for the proper treatment of asthma. L’espace makes treatment easier and allows a better coordination between MDI (Metered Dose Inhalers) output and inhalation. L’espace helps the adequate drug deposition in the lower airways preventing oral deposition and reducing side effects.

- Very low triboelectric charging
- Universal MDI (Metered Dose Inhalers) insert
- All models are autoclavable at 121 °C
- Single packed in protective carrying bag and carton box
- Tissue bag supplied for storage and transport
- Longer durability and robustness

**Innovative conic shape**
Flow dynamics delivers a higher fraction of the drug by increasing the deposition in the lower respiratory tract.

**Ideal volumes**
L’espace reduces the drug particles reaggregation that occurs in the spacers with smaller volumes.

**Bottom lid with adaptive air inlets**
Facilitated inspiratory effort and better flow dynamics.

**Comfortable anatomical mask**
Guarantees high levels of comfort and compliance. Optimal seal to prevent in and out air leaks.

**Patented valves system**
Efficient feedback of the correct use, simple to synchronise MDI output with breathing acts, easy to count breath.

L’espace ensures great functionality with reduced risk of errors during treatment, helping patient compliance.

- MOUTHPIECE
- ADULT MASK (non cooperating)
- PAEDIATRIC MASK 2-6 years
- INFANT MASK 0-2 years
Solutions at a glance

**Topical therapy: specific solutions for treating respiratory pathologies**

- **Rinowash**
  - MMAD 18 μm
  - removes secretions, mucus and catarrh
  - reactivates mucociliary movement in the nasal cavities
  - can be used with natural and drug solutions

- **Perfecta and Nebula Spacer**
  - very small particle size
  - specific for brief treatment
  - increases peripheral deposition of the drug
  - enhances patient compliance, increasing the treatment’s effectiveness

- **L’espace**
  - Increase drug deposition and the available inspiratory fraction of the nebulized drug

**Upper Airways**

- **For the treatment of:**
  - rhinitis
  - rhino-sinusitis
  - nasal polyposis
  - adenoiditis
  - tubotympanitis

- **For the treatment of:**
  - bacterial or viral respiratory infections
  - asthma
  - bronchitis
  - pneumonia
  - cystic fibrosis

**Lower Airways**

- **For the treatment of:**
  - asthma
  - COPD

Air Liquide Medical Systems is part of Air Liquide’s Healthcare division which supplies medical gases, hygiene products, medical equipment and specialty ingredients.

A dedicated team of 10,000 employees in over 30 countries around the world influence the lives of more than 1,000,000 patients at home and serve over 7,500 hospitals.

---

**Bibliography**

**Lower Airways**

- G. Galli, G. G. S. Di Paola, E. Brunetti, L. Di Berardino Comparison of traditional treatment and brief inhalation therapy with salbutamol using a new volumetric mask Published in the "Allergy and Asthma Proceedings"- Poster presented at the EAAACI (EUROPEAN ACADEMY OF ALLERGY AND CLINICAL IMMUNOLOGY) congress in Goteborg, Sweden, 9-13 June 2007

**Upper Airways**

- D. Passali, L. Belussi, A. Ferrara Gorga; (ORL Clinic, Siena) The treatment of rhinopathies with atomized nasal douche. Rivista Italiana di Chirurgia Allergologica e Firentina no. 4 October/December 1995
- F. Di Berardino, F. Scaglione – Department of Pharmacology, Milan University: Nasal Wash Allergia online: www.allergiaonline.com
- Poster presented at the ISAM (International Society for Aerosols in Medicine) Congress, Tours, France – 16-20 June 2007

**The choice of Air Liquide Medical Systems means certainty of quality. All products are entirely "Made in Italy", manufactured with biocompatible materials according to UN EN directive ISO 10993 and controlled and tested following the most severe trials. Air Liquide Medical Systems is certified:**

- ISO 14001:2004 Environmental Management Systems
Contacts

Air Liquide Medical Systems spa
Via Del Prati nr. 62,
25073 Bovezzo (Brescia), Italy
Phone: +39 (030) 20 159 11
Fax: +39 (030) 20 00 551

www.airliquidemedicalsystems.it