

The Most Effective, Safe and Affordable Solution to Prevent Viral and Bacterial Cross-Contamination



- ▶ High viral and bacterial filtration efficiency (99.999%)
- ▶ Low resistance to airflow
- ▶ Suitable for both lung function and exercise testing
- ▶ Minimal deadspace
- ▶ Available with both round and oval/ergonomic mouthpiece shape
- ▶ Individually packaged in 50 pieces box

Antiviral and antibacterial respiratory filters provide an easy way to ensure protection from cross-contamination which keeps both the patient and operator safe without compromising on system performance.

The use of filter during lung function and metabolic testing also reduce the amount of droplets aerosol dispersion in the air mitigating the contamination of the environment due to forced expirations and high ventilations required during testing. Preventing aerosol spreading is fundamental to minimize infection diseases transmission^{1,2}.

The resistance of the combined system necessary to perform the tests is inferior to those suggested by the ATS/ERS ($1.5\text{cmH}_2\text{O/L/s}@14\text{ L/s}$)³ both during inhalation and exhalation.

Filters are tested by independent laboratories passing BFE and VFE test using Staphylococcus Aureus (*ATCC #6538) and Bacteriophage PHI X174 (dimension about $0.025\text{ }\mu\text{m}$). According to current knowledge Coronavirus species, including COVID-19 have a particle size of $0.06\text{-}0.2\text{ }\mu\text{m}$, which is significantly larger than the bacteriophages used in the effectiveness tests. However, at this point in time we have not conducted any specific tests against COVID-19 as the challenge organism.

Filters comply with latest ERS guidelines recommending to use the filters with minimum proven efficiency for high expiratory flow of $600\text{ to }700\text{ L/min}^2$.

Two mouthpiece types, oval and round, guarantee the maximum ergonomics and the compatibility with any equipment connector.



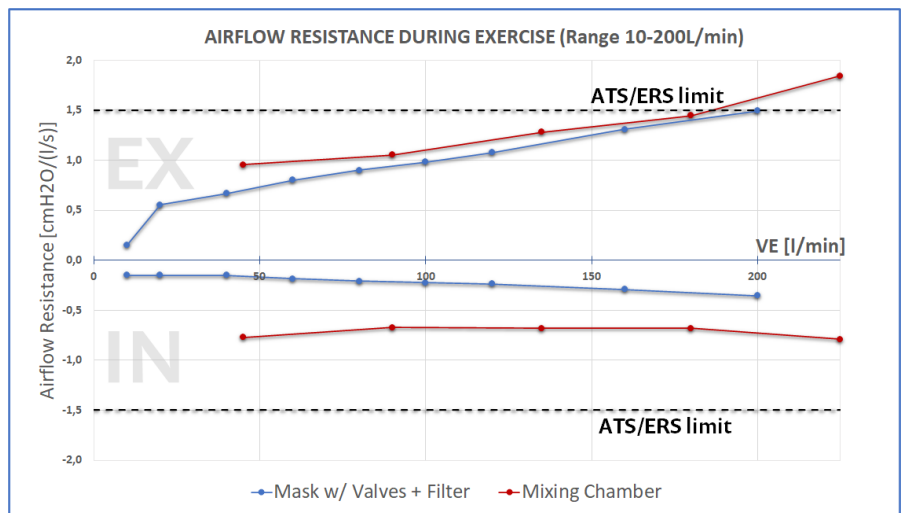
Filters have been tested to be used during Cardio Pulmonary Exercise Testing.

The following chart provides results of resistance to air flow at different ventilation rates up to 200 L/min that represent ventilation rates reached by high-level athletes.

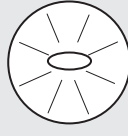
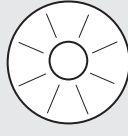
The validation protocol compares the results against a conventional mixing chamber metabolic cart and ATS/ERS maximal acceptable resistance for lung function testing equipment.

The new setups show good results for both expiratory and inspiratory resistance when using masks with or without inspiratory valves.

The additional dead space introduced by the new setups, does not affect VO_2 or VCO_2 calculation.



Technical Specifications

Mouthpiece Shape	 	
Product	Patient filter - Oval mouthpiece	Patient filter - Round mouthpiece
Part number	A 182 300 005	A 182 300 004
Dimensions	Machine side: OD 30.7mm, ID 26mm Patient side: Integrated mouthpiece Length: 86mm Width: 97mm	Machine side: OD 30.7mm, ID 26mm Patient side: OD 24.9mm, ID 20.9mm Length: 77mm Width: 97mm
Material	Housing: Polypropylene Filter Media: 200g electrostatic blended synthetic fibre	
Packaging	Box of 50 filters individually packed in single plastic bags	
Pathogenous agents	Bacteria and virus	
Bacterial filtration efficiency*	99.999% (Staphylococcus aureus @ 30L/min)	
Viral filtration efficiency*	99.999% (Bacteriophage @ 30L/min)	
Resistance (EN ISO 9360-1)	0.27cmH2O @ 30L/min 0.59cmH2O @ 60L/min 0.97cmH2O @ 90L/min	0.39cmH2O @ 30L/min 0.74cmH2O @ 60L/min 1.1cmH2O @ 90L/min
Dead space	75ml	
Applications	Pulmonary function test Spirometry	Cardio pulmonary exercise test (with adapter C05085-01-20) Indirect calorimetry



* The significance of % filtration efficiency is explained by the number of organisms passing through the filter. If the number of organisms challenging the filter are 1 000 000, when the efficiency is 99.999% only 10 organisms pass through (or only 1 if the efficiency is 99.9999%). A 99.999% filter is therefore 10 times more efficient than 99.99% filter.

References:

- (1) ERS COVID-19 resource centre (<https://www.ersnet.org/the-society/news/novel-coronavirus-outbreak--update-and-information-for-healthcare-professionals>); Novel Coronavirus (COVID-19): The ATS Response (<https://www.thoracic.org/professionals/clinical-resources/disease-related-resources/novel-coronavirus.php>)
- (2) Recommendation from ERS Group 9.1 (Respiratory function technologists/Scientists) Lung function testing during COVID-19 pandemic and beyond (<https://ers.app.box.com/s/zs1uu88wy51monr0ewd990itoz4tsn2h>)
- (3) "STANDARDISATION OF LUNG FUNCTION TESTING" Edited by V. Brusasco, R.Crapo and G. Viegi: Standardisation of spirometry, Eur Respir J 2005; 26: 319–338



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