

To whom it may concern

31 Jan. 2020

An outbreak caused by a novel Coronavirus (2019-nCoV), first identified in Wuhan, Hubei Province, China, is spreading fast. In spite of vigorous measures taken by the Chinese government the number of patients infected has risen daily since mid January. Infection control professionals are concerned that a pandemic similar to the 2002 SARS outbreak may occur, with cases of the infection now identified outside of China, in several countries in Asia, America and Europe.

The transmission dynamics are not fully understood but it is thought that the 2019-nCoV spreads among humans from an infected person's respiratory secretions, e.g. by coughing.

In the hospital environment patients infected with 2019-nCoV are likely to need respiratory support at some stage. We have therefore been asked the question whether Pall Breathing System Filters can provide protection against the spread of 2019-nCoV.

Pall Breathing System Filters were developed to act as a barrier against bacterial and viral contamination between the patient and the breathing system. We have not specifically validated our Breathing System Filters for the removal of the 2019-nCoV. However, Pall Breathing System Filters incorporate a proprietary pleated hydrophobic membrane, which is sealed into the filter housing by means of an ultrasonic welding technology. Numerous clinical publications have shown that our Breathing System Filters, consistently and reliably, prevent the potential risks of cross contamination and cross infection via breathing systems^{1,2}. They serve as a complete barrier (100% retention) to contaminated body fluids and have been validated to remove liquid borne contamination of a range of clinically relevant bacteria and viruses, including, but not limited to HIV, Hepatitis C virus and *Staphylococcus aureus*^{3,4,5}.

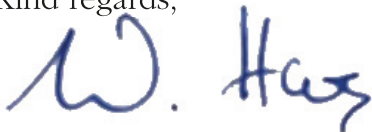
We expect that our Breathing System Filters will also protect against 2019-nCoV, if present in patient's airway secretions. During the 2002 SARS outbreak several researchers and infection control organizations, recommended to use a hydrophobic breathing system filter^{6,7,8}, or even more specifically a Pall Breathing System Filter^{9,10,11}.

In addition to the liquid borne route of transmission, airborne infection may play a major role in the spread of the disease. There is for example a high likelihood of generating aerosols during procedures related to mechanical ventilation, such as airway aspiration or bronchoscopy. Pall Breathing System Filters have been extensively documented to have an airborne bacterial and viral removal efficiency of at least 99.999% when tested with *Brevundimonas diminuta* and MS2 Bacteriophage.

Coronavirus species have a single stranded RNA and their size ranges from 120 nm to 160 nm which is considerably larger than the 27 nm MS2 Bacteriophage. Bacterial and viral removal efficiency has also been demonstrated with human pathogens such as Influenza A virus¹² (H1N1, size range 80 – 120 nm), and *Mycobacterium tuberculosis*¹³. Based on the testing carried out with MS2 Bacteriophage and Influenza A virus we expect that the Pall Breathing System Filters would remove aerosolized 2019-nCoV, arising from a patient's airway, with a high efficiency.

We hope you found this information useful. For further information about the Pall range of Breathing System Filters, please contact us your local Pall representative.

Kind regards,



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and Gas Filtration and Respiratory Care Portfolios

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- ¹ Hübner *et al.* (2011); GMS Krankenhaushygiene Interdisziplinär Vol. 6(1) ISSN 18635245
² Dubler *et al.* (2016); Acta Anaesthesiologica Scandinavica Oct;60(9):1251-60
³ Lloyd G *et al.* (1997); Centre for Applied Microbiology and Research
⁴ Lloyd G *et al.* (1997); Anaesthesia and Intensive Care; 25: 235-238.
⁵ Rosales M & Dominguez V. (1992); 2nd International Conference on Prevention of Infection, Nice, France
⁶ Ministry of Health, Province of Ontario, Canada; Directive 03- 06, 1st of May 2003
⁷ CDC Interim Domestic Infection Control Precautions for Aerosol-Generating Procedures on Patients with Severe Acute Respiratory Syndrome (SARS)
⁸ Peng P.W.H *et al.* (2003) Can J. Anesth, 50: 989 - 997
⁹ American Society of Anesthesiologists (2003); www.asahq.org/clinical/pracadvsars.htm
¹⁰ Lapinsky S.E. *et al.* (2003); Intensive Care Medicine 29: 870 - 875
¹¹ Taiwanese Respiratory Society Recommendation 2003
¹² Heuer *et al.* (2013); GMS Hyg Infect Control 8(1):Doc09
¹³ Aranha-Creado H. *et al.* (1997) ; Infect Control Hosp Epidemiol 18:252-254

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