

COVID-19: FACE MASKS AND EXTRACTION

INTRODUCTION

The COVID-19 outbreak has highlighted the need for protective equipment against viruses. Many businesses and individuals have turned to face masks as their primary defence. While these are a very useful tool, they do have their limitations. This document aims to inform on the benefits and limitations of using face masks and how the use of extraction systems with high grade HEPA filters can provide an added (and in some cases higher) level of protection.

COVID-19 VIRUS

The World Health Organization (WHO) states *“The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes”*¹.

Droplets generated by coughing and sneezing are typically 0.1-900 microns across (0.0001-0.9mm). However, once the droplet has settled (e.g. on a surface or filter), the moisture will start to evaporate, exposing the virus. The COVID-19 virus itself is 120-160 nm (0.00012-0.00016 mm)² making it much harder to filter than the droplet it is transported on.

TYPES OF MASK

There are several types of masks being used but two of the most common are surgical masks and N95 masks:

SURGICAL MASK



Surgical masks are designed to protect others from the wearer. In surgery they're used to prevent the operating staff from coughing or sneezing into the patient's open wound. They do not fit to the face so air (and potentially viruses) can enter around the sides.

N95 MASK



These are fitted to the face and therefore (if fitted correctly) the only path for air to enter is through the filter. These are much more effective at protecting the wearer than surgical masks. However, they do not protect the eyes which is a vulnerable mucus membrane.

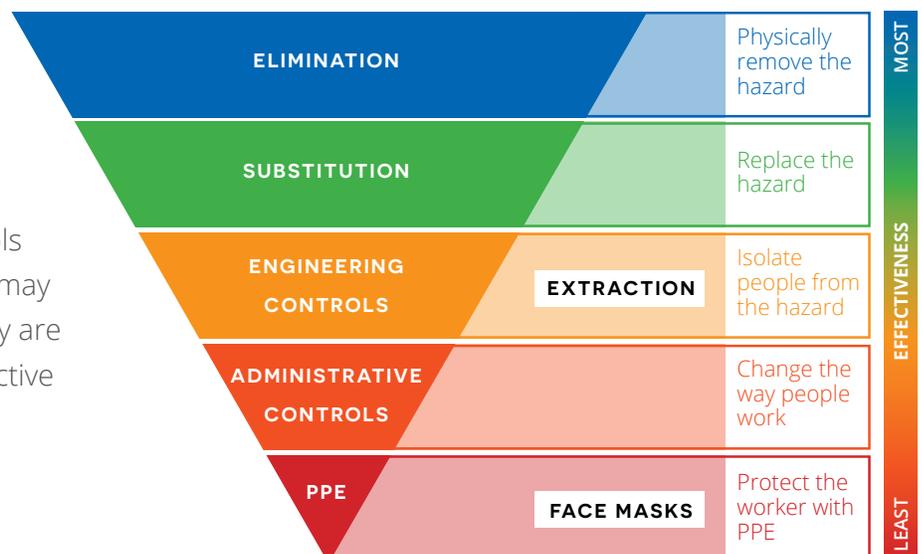
HEPA FILTERS

HEPA stands for High Efficiency Particulate in Air. BOFA extraction systems use HEPA filters rated to remove 99.997% of 0.3 micron (0.0003 mm) particles. 0.3 microns is the established Most Penetrating Particle Size (MPPS) and therefore the filtering efficiency increases for particle sizes larger AND smaller than this. ***“The major role of HEPA filters in laboratories is to remove a range of microorganisms from the air and to prevent their release into uncontrolled areas”***³.

ENHANCED PROTECTION: MASKS + EXTRACTION

The hierarchy of control tool is used widely across industries to minimize exposure to hazards. Extraction comes higher than the use of PPE, such as masks.

Use of an extractor is an example of protection through use of an engineering control. These types of controls generally take time to produce and implement so administrative controls (some may be temporary) and PPE may be appropriate supplements as they are quick to implement, until more effective controls can be put in place⁴.



FACE MASKS (E.G. N95)		EXTRACTION (E.G. BOFA SYSTEMS)	
BENEFITS	LIMITATIONS	BENEFITS	LIMITATIONS
<ul style="list-style-type: none"> Physical barrier Low cost N95 masks filter 95% @ 0.3 microns 	<ul style="list-style-type: none"> Virus held on mask filter therefore if it fails, it fails completely Only protects one person Handling of used mask is a hazard Must be fitted correctly to be effective Single use Doesn't protect the eyes (vulnerable mucus membrane) 	<ul style="list-style-type: none"> Captures at source Virus held in filters away from operator Multiple use BOFA HEPA filters 99.997% @ 0.3 microns 	<ul style="list-style-type: none"> Power requirement Capture efficiency decreases the further from the nozzle

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