



Republic of South Africa

Recommended Guidelines

Fabric Face Masks

Manufactured by South Africa's

Clothing and Textile Manufacturing Industry for General Public Use

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1 Overview

A 'fabric' face mask for the general public is only part of a broader solution to curb the spread of COVID-19 and it must always be used in combination with other hygienic methods of prevention. Such masks are not a replacement for other recommended precautionary measures. They should not provide a false sense of protection that lead to a lapse in the application of proper preventative measures like personal hand hygiene, respiratory hygiene and physical (social) distancing. Furthermore the design of fabric masks should be mindful of the thermo-physiological properties of fabrics which, if wrongly chosen, can lead to problems like skin irritation, the build-up of heat or moisture, or the incubation of bacteria etc, and may cause wearers to take off masks in situations when they should otherwise be wearing them.

There has been much debate globally about the use of face masks for non-Health Care Professionals (non-HCP) during the Covid-19 pandemic. There is agreement in the recommendations that symptomatic individuals and those in healthcare settings should use face masks. But discrepancies and mixed messages exist in relation to the wearing of masks by the general public. By refining some of the lessons from various sources, it is possible to arrive at a set of interim guidelines for the use of masks by the general public in South Africa. It is the intention of this document to distil these guidelines into a set of recommendations for the South African clothing and textile industry when making masks for use by the general public. These recommendations serve as suggested guidelines. They have been developed through engagements with publicly available research and recommendations from authorities like the World Health Organisation (WHO) as well as through insights provided by colleagues from the textile and polymer science programme within the University of Stellenbosch, the clothing and textile technology division in the Cape Peninsula University of Technology and staff at the National Department of Health and the Department of Trade, Industry, and Competition.

Fabric or 'cloth masks' do not fall in the same category as surgical or medical masks. Cloth masks cannot prevent the risk of contracting the virus in aerosol form (as found in a contaminated atmosphere) since this requires the presence of very fine and highly specialised filters capable of trapping microscopic viral particles. The shortage of medical grade masks globally and in South Africa means members of the public should not to use these critical resources at the expense of frontline health workers. In this context, and given that evidence indicates that the virus appears to largely exit through the mouth of an infected individual in droplet form (during coughing or sneezing) it is believed that if the fabrics and filters used in fabric of cloth masks are chosen suitably, these masks can play an important role in reducing the community transmission of the virus. They further appear to lower the risk of contracting the virus from contaminated surfaces by acting as a barrier to touching one's face. The function of such public masks may be enhanced or impeded by their design and the products used to make them, although it is also believed that any mask may be better than not wearing a mask.

2 Basic Performance Requirements of Fabric Masks

- The mask should act as a barrier to extremely small droplets generally upwards of 5 microns in size secreted at a speed like that when a person exhibits respiratory symptoms such as sneezing or coughing (WHO 29/4/2020). The higher the performance of the barrier the better.
- Masks must be breathable. Should the mask prevent one from breathing easily, this will present a serious danger to the health of the wearer - not only from becoming oxygen deprived but also because the mask will promote risky behavior like the need to touch the face and remove or adjust the mask during wear, increasing the risk of transmission of the virus.
- Masks must be designed to fit properly. They should be comfortable to wear. Discomfort will undermine one's health by promoting the need to touch the face and remove or adjust the mask during wear.
- Cleaning and disinfection of all the components should be easy to carry out at home.
- All components should be durable and should maintain their integrity during the full expected life span of the product or components.
- All masks should be accompanied by instructions clearly stating what the limitations of a mask are and when the mask or its components must be replaced.

3 Fabric Selection for Fabric Masks

To ensure optimum performance as a barrier:

- Use nonwoven or woven fabrics with the highest possible yarn density and very small spaces between fibres.
- Thicker fabrics will provide more resistance if they have a tight weave but must allow easy breathing during wear.
- Fabrics should not allow liquids to move through them. They should exhibit an amount of water resistance.

The mask should be comfortable to wear

- Make sure the inner layer fabric does not irritate the skin.
- Fabrics should not be absorbent and become wet. They should be breathable to allow water vapour to escape and not condensate on the inside.
- Fabrics should not contain any toxic chemicals or excessive lint.
- A new prototype can be easily tested for comfort by wearing it for 30 minutes.

Disinfection of all the components should be easy to carry out at home and components must not deteriorate with use/cleaning.

- Cleaning (soil or stain removal) of outer material must be easy.
- Fabrics must be easily washable, fast drying and have good appearance retention.

- The barrier layers should not increase in permeability with cleaning and resultantly decrease in functionality over time.
- Masks can be disinfected by washing in hot water and soap and preferably being ironed. Alternatively, it appears the Covid-19 virus can be killed by soaking the cloth for at least 5 minutes in boiling temperature water (do not boil while soaking).

4 Designs for Fabric Masks

- Bearing in mind that different fabric constructions and innovations allow for different properties and functions, there is merit in a mask designed from at least two layers of suitable fabric or three layers of such fabric (two layers plus an extra third barrier layer in the centre).
- **The outer layer** (which faces towards other people) could be made of a nonwoven or thicker woven fabric that is preferably hydrophobic or water repellent. It should not wet easily and must be easy to clean and be quick drying. The outer layer should be suitable for the design: some designs may require a stiffer fabric while others may require soft draping fabrics. Avoid stretch materials (knits like t-shirt materials) as the outer layer since the space between fibres will become larger when worn over the face.
- **The inner layer** (which sits against the face) must have a pleasant feel on the skin. It could be comprised of the same material as the outer layer but this is not necessary. It must not wet easily or accumulate wetness with breathing, and it must not inhibit breathing. Polyester or nylon is preferred but other alternatives can also work. If using cotton or viscose rayon take care as these fabrics are highly water absorbent and might become wet against the skin.
- **If a middle/ filter layer** is used to enhance the barrier function of the product, choose a textile that is able to inhibit the transfer of small particles. Options may include nonwoven structures, amongst others. This layer should also not inhibit breathing. The filter should be big enough to cover fluid excretions exiting from the mouth during coughing or sneezing. If the mask is designed with a replaceable filter, it is suggested that the pocket into which it fits should be standardised across the industry in order to align the design of masks with inputs produced for those masks. A pocket of at least 120mm x100mm is proposed.
- Masks must be designed to fit properly, ideally covering at least 50% of the length of the nose and fit to 25mm under the chin.
- It is useful to provide markings or features that help the wearer to distinguish between the inner layer and outer layer of the mask in order to prevent wearers from placing the wrong side against their faces.
- The ties or elastics used to fit the mask to the face should not be designed to require that the wearer touches the front of the mask at all.
- Special needs may arise within some groups of society (such as hearing-impaired individuals who rely on lip reading) whose needs should also be considered when making masks.

5 Instructions for Using Fabric Masks

Clear instructions should be provided to consumers about the capabilities and limitations of masks. At the very least guidance should be given that when re-usable fabric masks are worn:

- They do not constitute medical PPE nor are they a replacement for normal precautionary hygienic measures such as handwashing, not touching one's face, coughing or sneezing into a tissue or elbow and keeping a proper social distance of 1,5m from other people.
 - The wearer should ensure the masks have been appropriately washed and disinfected before use
 - Clear instructions must be provided around the proper protocol for wearing masks, including at a minimum that wearers should avoid touching the mask during use and that when putting on or taking off the mask, one's hands must have been cleansed after practicing appropriate hand hygiene;
 - That re-usable masks or the components used within the masks may need to be replaced if they are damaged or worn out, or if they have exceeded any their lifespans or use; and
 - That children should be supervised at all times when using a cloth mask, and they are not recommended for infants who may struggle to breathe with a mask or even choke if they put parts in their mouths.
 - A guide must be supplied with a mask on how to wear and how to care for it.
 - A fabric face masks are not to be used by Health Care Professionals working in a health care environment.
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