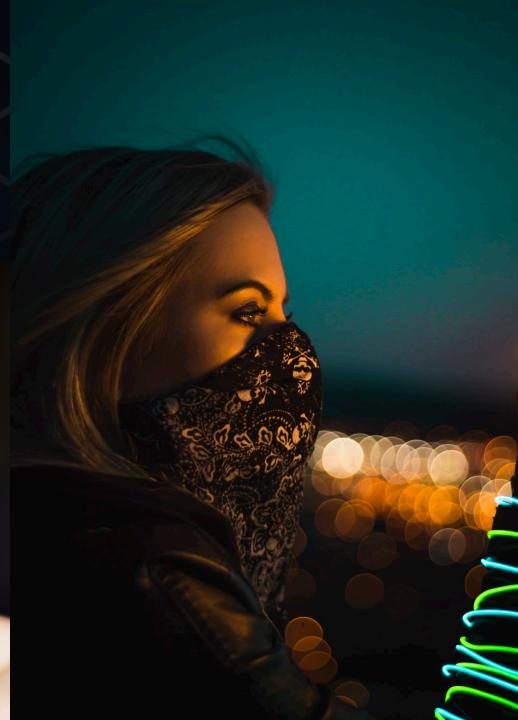




# COVID-19 REUSABLE HYGIENIC FACE MASKS

This document will explain how to  
produce personalized hygienic face  
masks with the HP Stitch S Printer Series



# INTRODUCTION

Introduction

Face mask options

Certification process

Materials

How to produce face masks

## COVID-19 REUSABLE HYGIENIC FACE MASKS

In these challenging times presented by COVID-19, **customized face masks** are turning into **fashion statements**, as people have increasingly started embracing the use of this accessory to prevent transmission. From colorful images to a variety of patterns that complement outfits, this application has become a popular trend that is here to stay. So, why not get started?

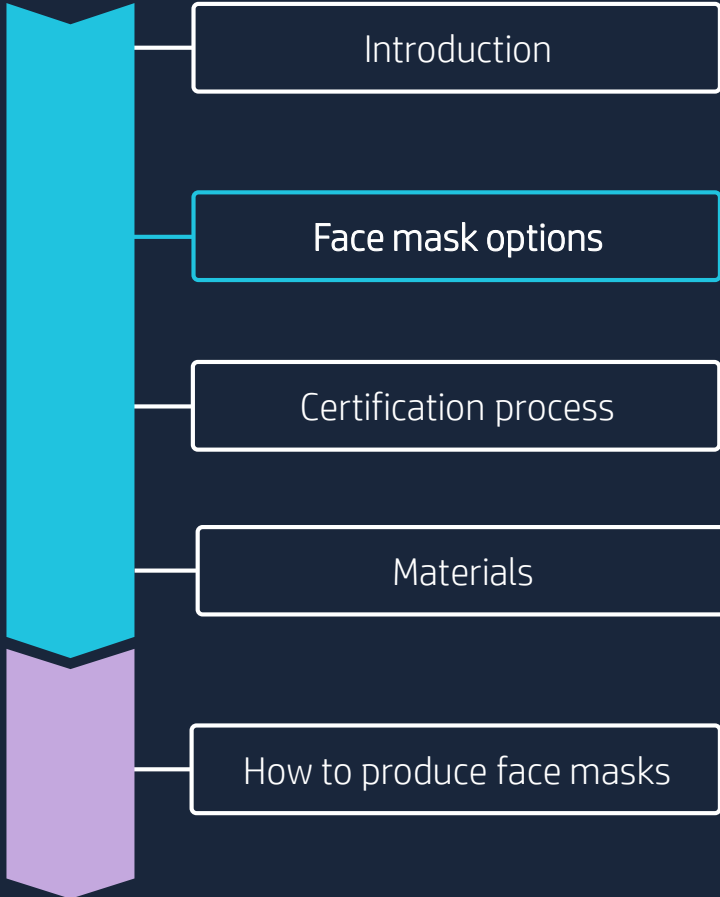
We will indicate which **mask options, materials** and **certifications** are appropriate for producing **personalized hygienic face masks**. Also, we will explain **how to create masks** with the **HP Applications Center** tool and **how to print on them** with the **HP Stitch S printer Series**, and conclude with **tips** for **washing** and **care**.

**Disclaimer** - By using any of the indicated Designs you acknowledge that:

- All Designs have been created by HP and its partners in response to the global COVID-19 pandemic;
- HP and its partners have no prior expertise in the designing and manufacturing of Personal Protective Equipment (PPE) and therefore this Design has neither been made by reference to any specific regulations nor subject to any formal testing regime;
- Any user of the Designs shall assume all responsibility for developing the design in conformity with regulatory and testing requirements of any markets it intends to make the products available in;
- To remove any doubt, the Designs are provided AS IS and HP and its affiliates shall not be liable for any loss or damage to users or any other third parties related to the use caused as a result of the Designs. The Designs are for professional use only and neither HP nor its affiliates make any representations, guarantees or warranties of any kind with respect to the Designs or their use. The Designs may not be used for any unlawful purposes. Given the exigent circumstances under which these Designs are being provided, HP and its affiliates make no representation as to the safety and efficacy of any product created from the Designs.



# FACE MASKS OPTIONS



## FACE MASKS OPTIONS

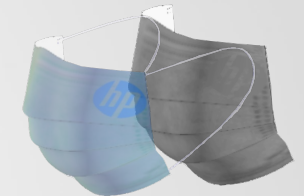
Depending on the material selected, the face masks require one or multiple layers. It is important to find the correct balance between filtration and breathability.

### SINGLE LAYER

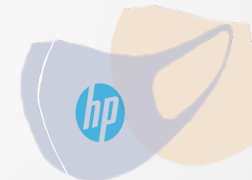
### MULTIPLE LAYERS

### MULTIPLE LAYERS + FILTER\*

Pleated



Non pleated



- **Single Layer** - The material can be sublimated and it acts as a filter for particles.

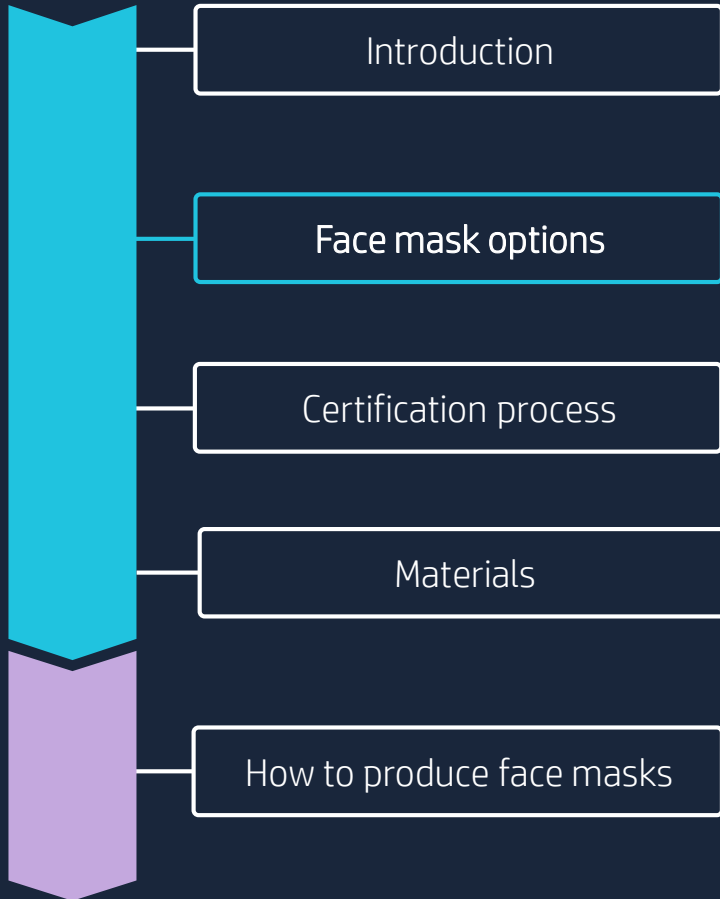
- **Outer Layer** - high content of Polyester (>75%) to get a good print result.
- **Inner Layer** - Comfortable for the skin and allow a good moisture control. Can be made from PES; CO, CV. Filtration is achieved combining the two materials.

- **Outer Layer** - high content of Polyester (>75%) to get a good print result.
- **Middle Layer** - Filtration capacity. Normally a PE non-woven due to breathability.
- **Inner Layer** - Comfortable for the skin and allow a good moisture control. Can be made from PES; CO, CV.

\* MULTIPLE LAYERS + FILTER masks can be designed to use interchangeable filters. The Inner and Outer layers need to be sewed with an open pocket to place the filter.



# FACE MASKS OPTIONS



## FACE MASK LAYERS

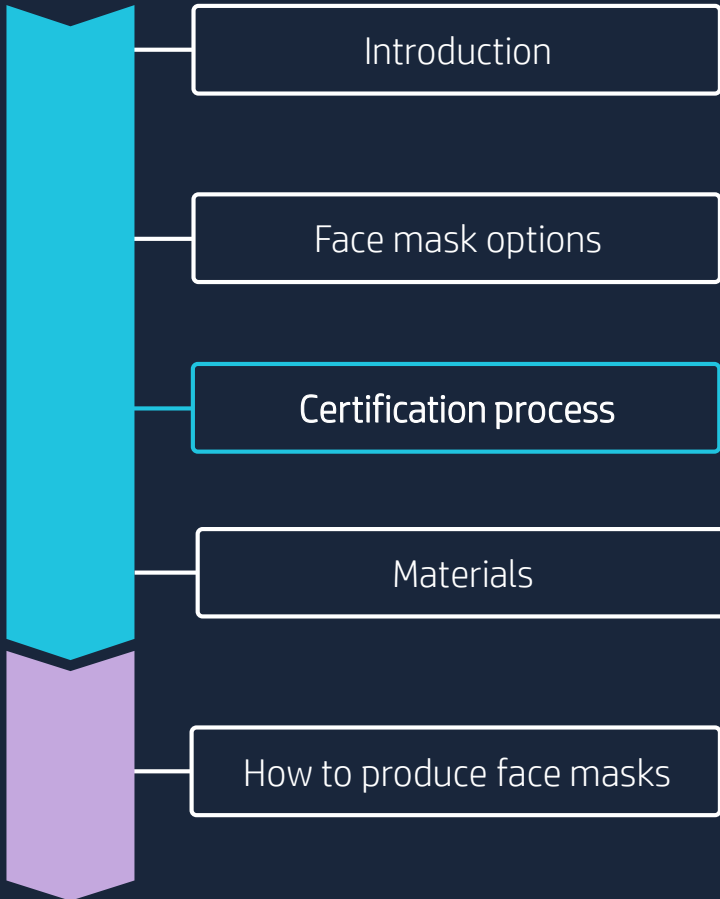
As previously mentioned, face masks require one or multiple layers. The properties of these layers can be different as they have different functions in the mask structure:

**OUTER LAYER** – This layer is the **only printable** one. To print on it with the dye sublimation technology, this layer **requires >75% PES** content to ensure a good color saturation. It has a structural function and works as the first barrier against external agents.

**MIDDLE LAYER** – This layer is meant to retain the particles thanks to its **filtration capacity**. The best results are obtained by using a non-woven material (TNT) that should provide high filtration capacity (up to 0.3  $\mu\text{m}$  particles) and keep a good breathability. The washing capability of this materials need to be checked with the manufacturer.

**INNER LAYER** – This layer has **moisture management properties** and a nice touch & feel to make it comfortable when it's in direct contact with the skin. It can be 100% cotton, viscose, polyester or a blend. Combined with the outer layer, the inner layer creates the mask structure. Oeko-tex fabrics are recommended for this type of layer.

# CERTIFICATION PROCESS



## CERTIFICATION PROCESS

The certification process is not mandatory in all countries, however we recommend to contact your local regulatory and certification office to clarify what regulation is applicable to your country, as the threshold changes country-to-country. For example, France and Portugal accept a filtration level between 70-90% for non workers masks, while Spain requires 95% of filtration.

The face masks are technical products regulated by the following:

- **Personal Protective Equipment (PPE EN 149:2001 / NIOSH )**
- **Medical Face Masks (EN 14683:2019 + AC:2019 / ASTM F2100)**

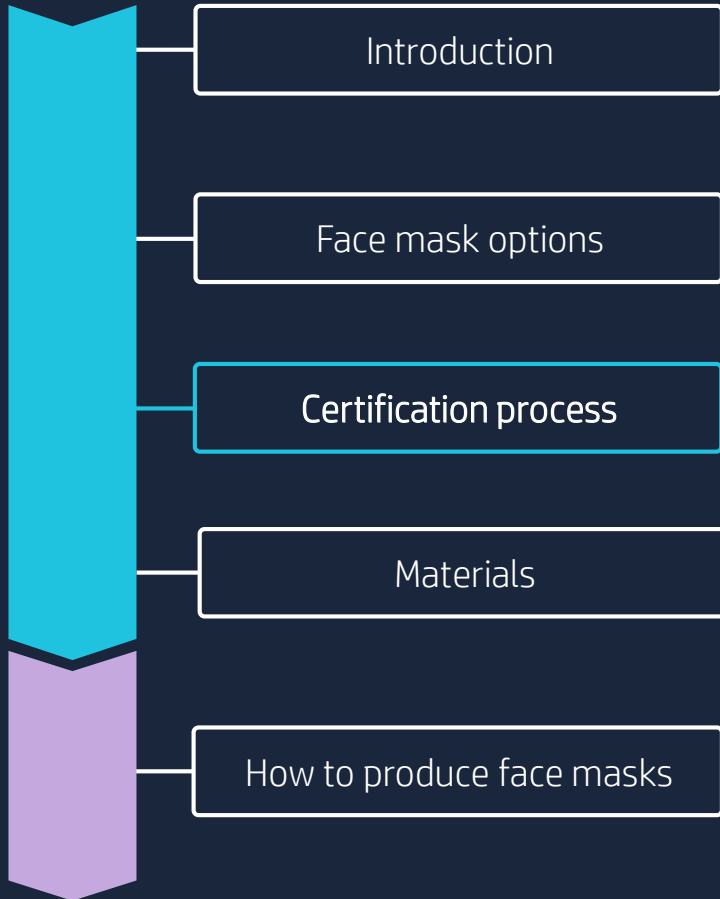
Due to the great demand for this product, many countries started implementing a temporary **Alternative Test Protocol (ATP)** that simplifies the tests for the social face masks **not designed to be used as PPE/ medical mask**.

The **Alternative Test Protocol (ATP)** focuses on two key parameters:

	ATP	Alternative
<b>Filtration</b>	Bacterial Filtration Efficiency (BFE) EN 14683:2019 (Anexo B) (3 µm ≥95%)	Particle Retention Capacity (PRC) (3 µm ≥95%)
<b>Breathability</b>	Differential Pressure EN 14683:2019 Anexo C (≤ 40 Pa/cm <sup>2</sup> )	Air-Permeability EN ISO 9237:1995 (≥ 8 l/min)



# CERTIFICATION PROCESS



## CERTIFICATION PROCESS

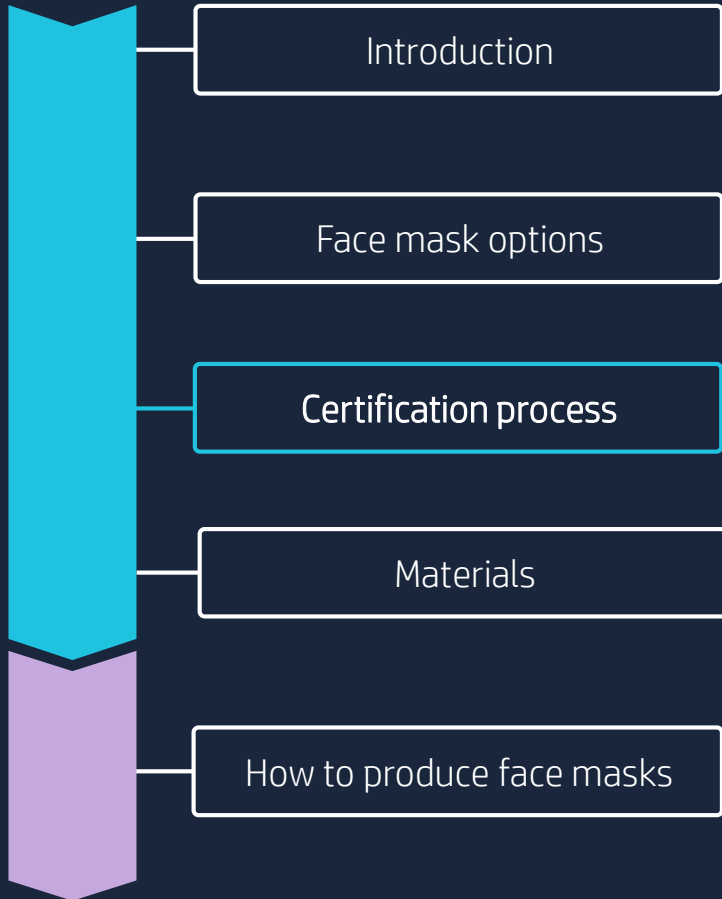
There are two levels of certifications:

1. Certification of the **material**
2. Certification of the **face mask design (final product)** – this certification includes the number of washes.

Depending on each country's regulations, one or both certifications are required. To give transparency and trust about the social masks productions, the certification labs in some countries are issuing certified labels that assure the mask performance respects the local thresholds.



# CERTIFICATION PROCESS



## EUROPEAN AGENCIES

**Labs**  
with mask testing capabilities

	EN 14683 Medical face masks - Requirements and test methods						EN 149 PPE face masks (FFP2 and FFP3)	
	Bacterial filtration efficiency (BFE)	Breathability	Splash resistance	Microbial cleanliness (Bioburden)	Biocompatibility	Cytotoxicity, dermal irritation etc.	can do test	can give a certificate
Centexbel, Belgium	YES	YES	YES	YES	YES	YES	NO	NO
DEKRA Testing and Certification GmbH, Germany (NB n°158) <sup>1</sup>							YES	YES
EUROFINS ATS, France	YES	YES	YES	YES	YES	YES	NO	YES
Eurofins Textile Testing, Spain	YES	YES	YES					
Force Testing / Force Certification (notified body n°200), Denmark							YES	YES
Hohenstein, Germany <sup>3</sup>								
HygCen Austria GmbH	YES	YES	YES	YES		YES	Under construction	
IFA - Institut für Arbeitsschutz der DGUV (NB n°121), Germany <sup>1</sup>							YES	YES
RISE Research Institutes of Sweden AB	YES	YES	YES	YES	YES	YES		YES
VTT, Finland	YES <sup>2</sup>	YES <sup>2</sup>					Partially <sup>2</sup>	

# CERTIFICATION PROCESS

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## EUROPEAN AGENCIES

### Centexbel, Belgium

[www.centexbel.be](http://www.centexbel.be)

📞 Mark Croes  
[mc@centexbel.be](mailto:mc@centexbel.be)  
+32 4 296 8250



### DEKRA Testing and Certification

<https://dekra-testing-and-certification.de>  
[products.de@dekra.com](mailto:products.de@dekra.com)  
+49 711 7861 3454



### EUROFINS ATS

[www.product-testing.eurofins.com](http://www.product-testing.eurofins.com)  
📞 Armelle Davy Bevilacqua  
[armelledavybevilacqua@eurofins.com](mailto:armelledavybevilacqua@eurofins.com)  
+33 4 42 3714 21



### Eurofins Textile Testing

[www.product-testing.eurofins.com](http://www.product-testing.eurofins.com)  
📞 Enrique Rivas  
[enriquerivas@eurofins.com](mailto:enriquerivas@eurofins.com)  
+34 678 308 198



### FORCE Certification A/S

<https://forcecertification.com>  
[info@forcecertification.com](mailto:info@forcecertification.com)  
+45 43 25 01 77



### Hohenstein

[www.hohenstein.com](http://www.hohenstein.com)  
[customerservice@hohenstein.com](mailto:customerservice@hohenstein.com)  
+49 7143 271 898



### HygCen Austria GmbH

[www.hygcen.at](http://www.hygcen.at)  
📞 Monica Feltgen  
[feltgen@hygcen.at](mailto:feltgen@hygcen.at)  
+43 6462 5319



### IFA (Institut für Arbeitsschutz der DGUV)

[www.dguv.de](http://www.dguv.de)



### RISE Research Institutes of Sweden AB

[www.ri.se/en/what-we-do/services/testing-protective-devices](http://www.ri.se/en/what-we-do/services/testing-protective-devices)  
📞 Marcus Vestergren  
[marcus.vestergren@ri.se](mailto:marcus.vestergren@ri.se)  
+46 70 382 52 87



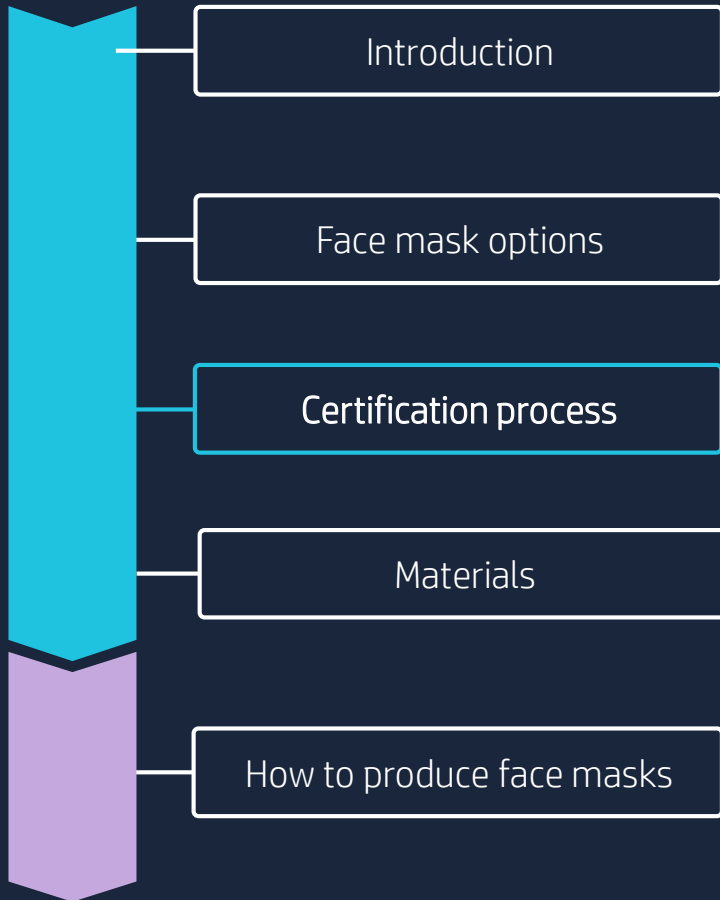
### VTT

**Technical Research Centre of Finland**  
[www.vttresearch.com](http://www.vttresearch.com)  
📞 Hannu Salmela  
[hannu.salmela@vtt.fi](mailto:hannu.salmela@vtt.fi)  
+358 407 600 090





# CERTIFICATION PROCESS



## AMERICAN AGENCIES

There are three federal agencies that can provide good guidance on guidelines for masks:

1. U.S. Food and Drug Administration (FDA). [Outline for premarket notifications with regard to surgical masks](#)
2. Centers for Disease Control and Prevention (CDC). [CDC guide to homemade masks](#)
3. National Institutes of Health (NIH)

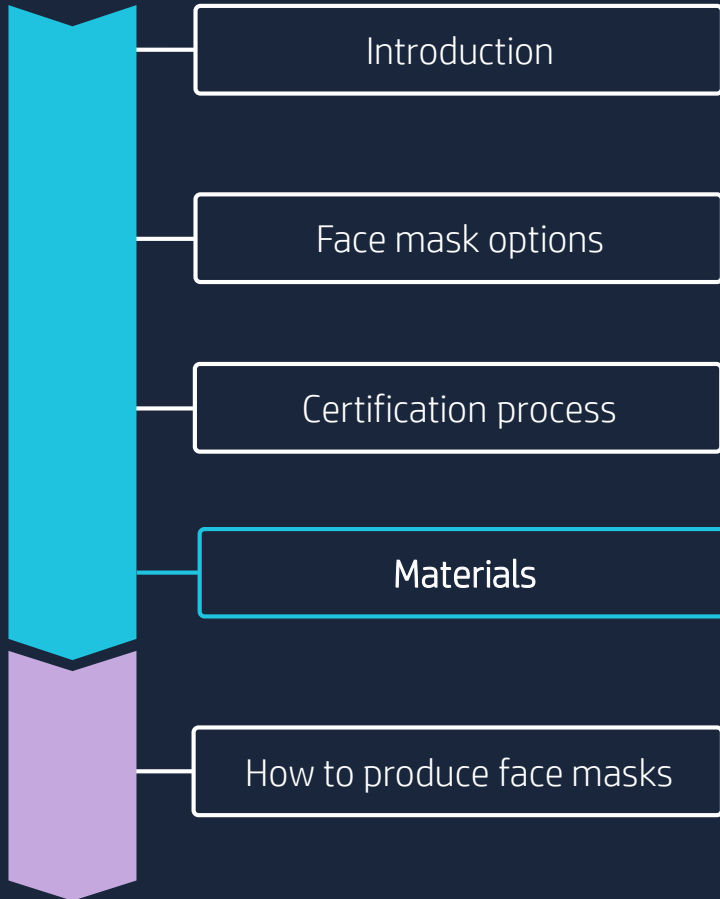
Labs in the US that test masks:

- Nelson Labs: <https://www.nelsonlabs.com/testing/surgical-face-masks-and-general-use-masks-astm-f2100/#>
- HP White: <http://www.hpwhite.com/non-ballistic-testing/respiratory-testing/>

Labs in Canada that test masks:

- Cambridge Materials: <http://www.cambridgematerials.com>

# MATERIALS



## RECOMMENDED PAPER GRAMMAGE

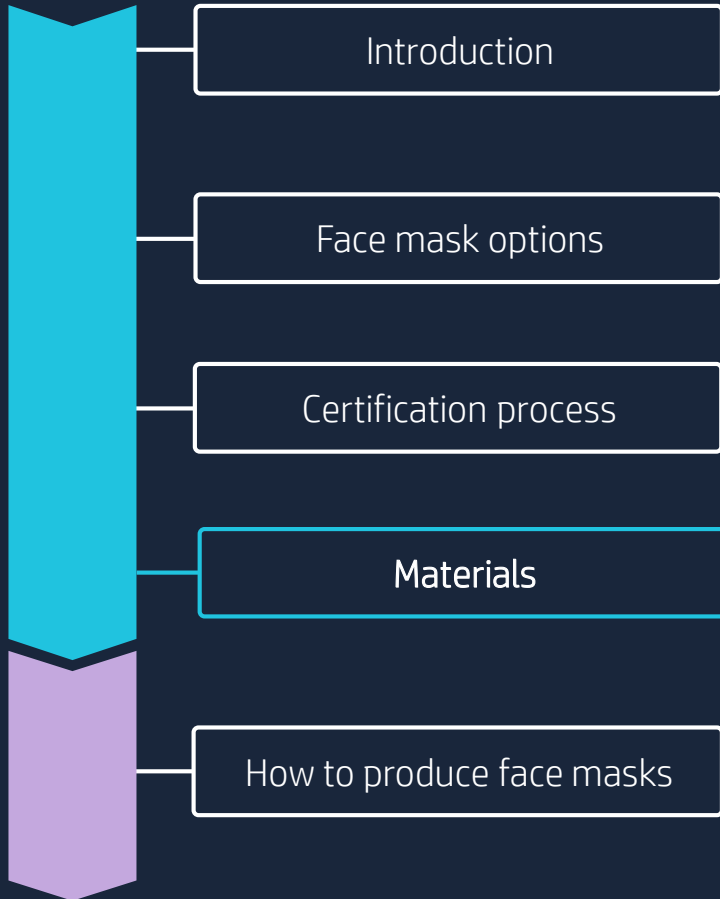
Depending on the workflow, the type of fabric used and the saturation wanted, different papers can be used. If pre-cut fabrics are used, it is recommended to use tacky paper to avoid calender issues.

TACKY PAPERS (for pre-cut fabrics)	GSM
Beaver Paper Texprint Elite	92
Beaver Paper TexPrint TT supreme	100
Coldenhove Jetcol TA	105
Gans & Ink PyroTrans 105 Tacky	105
Mitsubishi SPT 83	83
Sappi TransJet Sportline 931	100
Sihl SubliColor Sports Paper 90 matt	88

\* See the post-processing recommendations that can be found in this document to get the best results.



# MATERIALS



## RECOMMENDED PAPER GRAMMAGE

NON-TACKY PAPERS (for roll-to-roll fabrics)	GSM
Beaver Paper TexPrint XPHR	105
Coldenhove Jetcol High Speed	95
Daio H 107	107
Gans & Ink PyroTrans 105	105
Hansol Paper Subli-Mate Smart 95	95
Kasper Heavy 105	105
Mitsubishi SPF110	110
Sappi Transjet Eco II 8385	95
Sihl SubliColor Universal Paper 90 matt	88

\* See the post-processing recommendations that can be found in this document to get the best results.



## RECOMMENDED MATERIALS BY BRAND MANUFACTURER\*

Vendor	Material Reference	Certification Status	Layer	Washable?	PES Content	Filtration Capacity	Breathability (Pa/cm2)
<a href="#">A sampaio</a>	66832	CITEVE Covid Nivel 3	Outer		Jersey Van. 90% PES / 10% EA 120g/m2	70-90%	> 8l/m
	66829	CITEVE Covid Nivel 3	Inner		Felpeo (Fine Fleece) 100% PES 140g/m2 C7 Carda	70-90%	> 8l/m
<a href="#">Berger</a>	be.tex® SEG Display FR	NO	Outer / Single layer	Yes	100%		
	Cotton canvas FR	NO	Inner/ Single layer	Yes	0%		
<a href="#">Comersan</a>	Estampines Mascarillas (3 capas)	Approved by Mincotur	3 Layers: Outer/Middle/Inner		100%	97,95%	31
	Microstyle Mascarillas	NO				99,71%	Above range
	Microbana Mascarillas	NO				97,59%	113
<a href="#">G+O</a>	Decotex 7058	NO	Outer / Single layer	Yes	100%		
	DecoTex GFS 7048GFS	NO	Outer / Single layer	Yes	100%		
	Brush GFS 7818GFS	NO	Outer / Single layer	Yes	100%		
	BiFlex GFS 8484GFS	NO	Outer / Single layer	Yes	100%		
<a href="#">Heytex</a>	Heytex protect	NO	Outer / Single layer	Yes	100%		
<a href="#">HispanoTex</a>	HIDROBLOCK POLE	Approved by Mincotur	Outer / Single layer	10 Times	65%PES/35%CO 100 g/m2	93,44%	25
<a href="#">Jacob-Holm</a>	Sontara Style 9003				100%		
<a href="#">PONGS</a>	Standard Muslin Cotton	Antibac on request	Inner/ Single layer	Yes, up to 95º	0%		
	Muslin 4x16 Cotton	Antibac on request	Inner/ Single layer	Yes, up to 95º	0%		
<a href="#">Premier Textile</a>	2411	No	Single layer	Yes	70%		
	6939	No	Outer / Single layer	Yes	100%		
	3105	No	Single layer	Yes	52%		
	2386	No	Inner/ Single layer	Yes	0%		
	3014	No	Inner/ Single layer	Yes	0%		
	7005	No	Inner/ Single layer	Yes	0%		
	2442	No	Outer / Single layer	Yes	100%		
	2464	No	Outer / Single layer	Yes	100%		

\* More media vendors are going through certification process



## RECOMMENDED MATERIALS BY BRAND MANUFACTURER\*

Vendor	Material Reference	Certification Status	Layer	Washable?	PES Content	Filtration capacity	Breathability (Pa/cm2)
<a href="#">Sedatex</a>	Fanotex						
	560401 LESAKA	-	Doble layer with a filter in between	Yes	100%		
	527401 LOCK	running the AFNOR tests	Multiple layer	Yes	100%		
	579501 PEPLUM PERCHADO	-	Single layer	Yes	100%		
	500803 ZUBI GRUESO	-	Single layer	Yes	100%		
<a href="#">Sportswear Argentina</a>	100407 CARMEN PESADO	-	Single layer	Yes	92%		
	119505 PLATON PESADO	running the AFNOR tests	Multiple layer/Double layer	Yes	84%		
	555101 OSLO	running the AFNOR tests	Double layer	Yes	100%		
	103801 CROW POWER	running the AFNOR tests	Single layer	Yes	74%		
	601201 NASSAU SARGA	AFNOR regulations	Single layer	Yes	100%		
	603003 BATUI PERCH	AFNOR regulations	Single layer	Yes	80%		
<a href="#">Textil Manly</a>	TEC 7191	Approved by Mincotur	Single layer	5 times	80%PES20%PA - 126 gr/m2.	94,16%	19
	TRIPRO01	CITEVE Covid Nivel 3	Outer		Interlock 100% PES 160gm/2 Card	70-90%	> 8l/m
<a href="#">Tinamar</a>	TRIPRO02	CITEVE Covid Nivel 3	Middle		Interlock 100% PES 150g/m2	70-90%	> 8l/m
	TRIPRO03	CITEVE Covid Nivel 3	Inner		Jersey 100% CO 110g/m2	70-90%	> 8l/m

\* More media vendors are going through certification process



# HOW TO PRODUCE FACE MASKS

Introduction

Face mask options

Certification process

Materials

How to produce face masks

## WHAT YOU WILL NEED



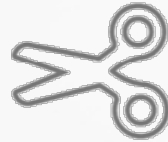
Textiles



Tissue  
Paper



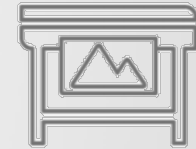
Transfer  
Paper



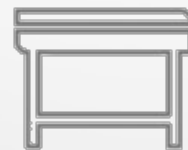
Cutting device



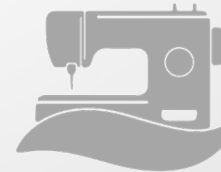
SW tools  
(RIP, edition, etc.)



Printer



Calendar



Sewing machine

## Accessories

Elastic cords and Nose clips

# HOW TO PRODUCE FACE MASKS

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## ACCESSORIES



Elastic Cord



Adjustable Earloops



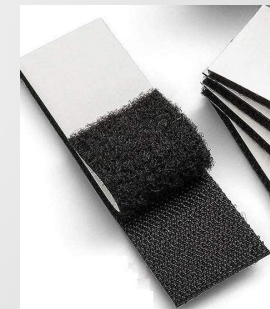
Braided Elastic



Aluminum Nose Clips  
3-5 mm x 9-11 cm

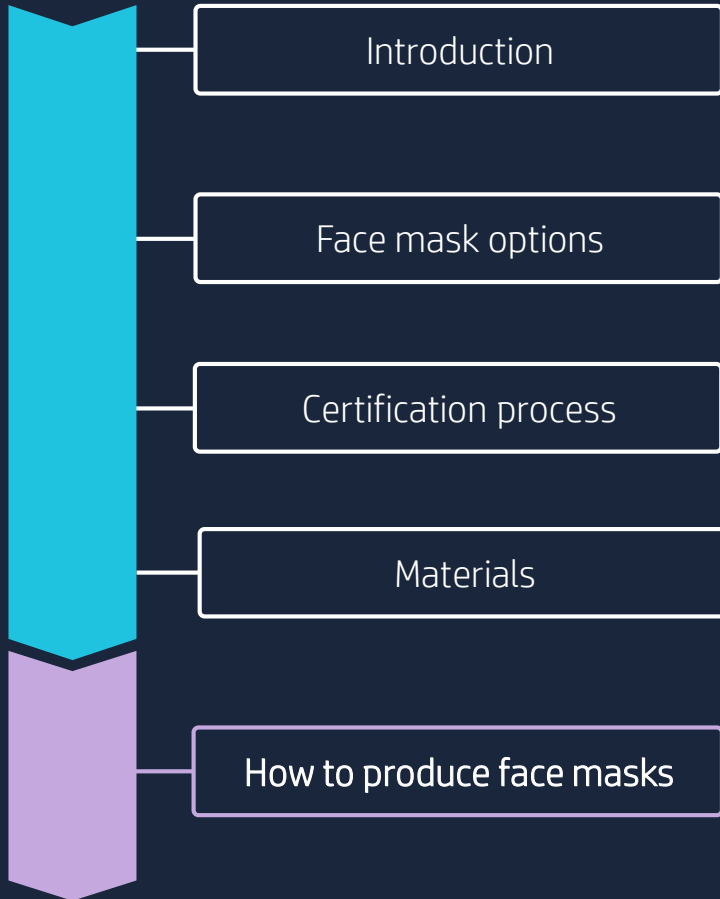


Twist Ties (Nose Clips)  
3-5 mm x 9-11 cm



Velcro Straps

# HOW TO PRODUCE FACE MASKS

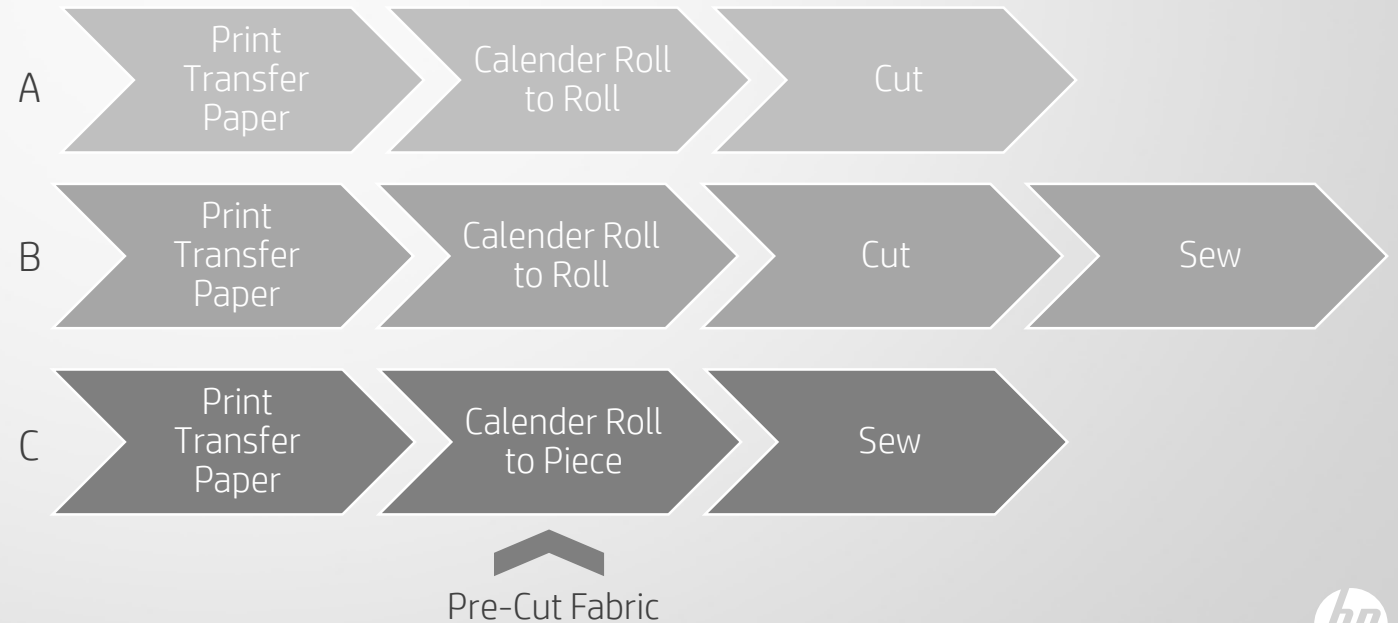


## PRODUCTION WORKFLOW

The workflow should be carefully selected, taking into consideration: materials, equipment available at the printshop, production quantities, and mask design.

The mask design and the material selection will define the quality, the comfort and the barrier efficiency of the mask.

Mask efficiency can be improved by adding layers and accessories.





# HOW TO PRODUCE FACE MASKS

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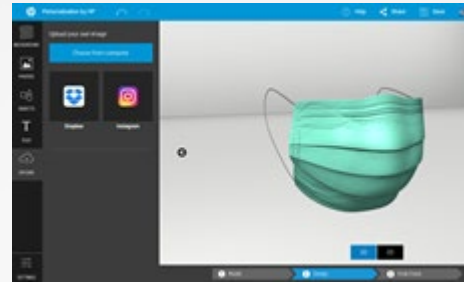
Materials

How to produce face masks

## HP APPLICATIONS CENTER – Face Masks App for personalized mask designs



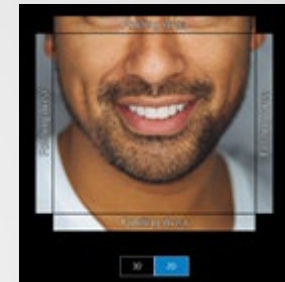
A simple and intuitive free web-based design solution, that allows you to design and automatically generate print ready files.



*Web based designer with simple and intuitive access to personal images, stock graphics and text*



*Easily preview designs with the realistic 3D model view*



*Adjust designs with the 2D pattern template*

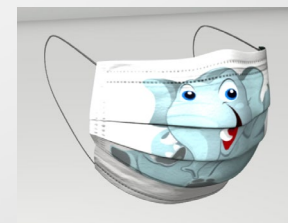
Help consumers and business customers alike regain their sense of identity with personalized designs



*Fashion patterns*



*Retail brands*



*Playful interaction*



*Delivery services*

# HOW TO PRODUCE FACE MASKS

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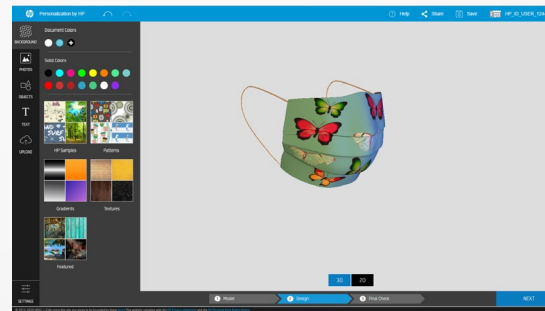
How to produce face masks

## HOW TO DESIGN A MASK WITH THE HP APPLICATIONS CENTER

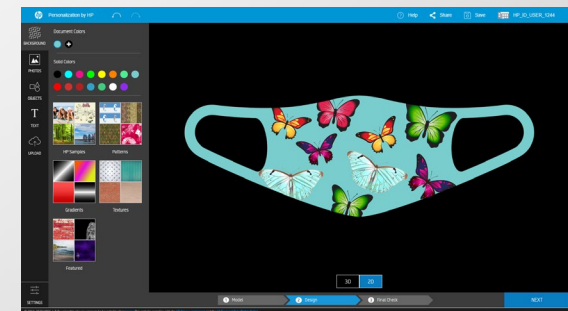
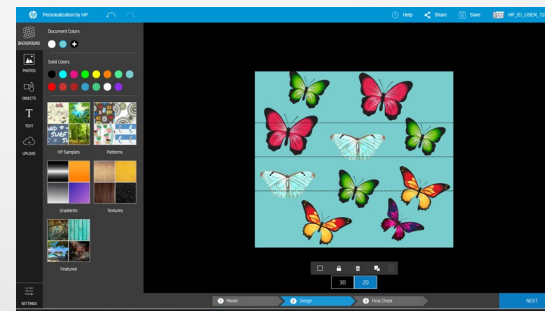
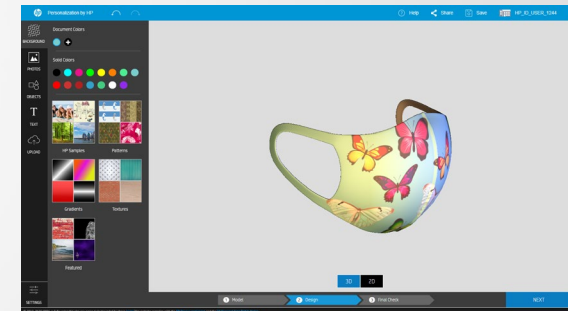


1. Go to [HP Applications Center](#)
2. Launch the Face Mask app in the Dashboard
3. Select your mask style
4. Create your design, download and print

Pleated mask



One piece mask



# HOW TO PRODUCE FACE MASKS

Introduction

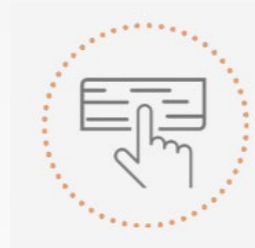
Face mask options

Certification process

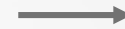
Materials

How to produce face masks

## PREPARE YOUR FILE TO BE PRINTED



TRANSFER PRINTING



Mirror mode for Transfer printing

Print your file in Transfer Paper print mode

# HOW TO PRODUCE FACE MASKS

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Face mask options

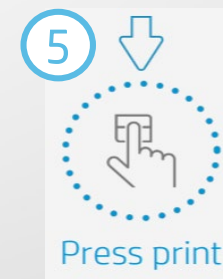
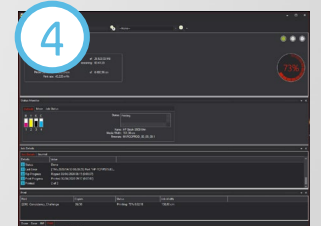
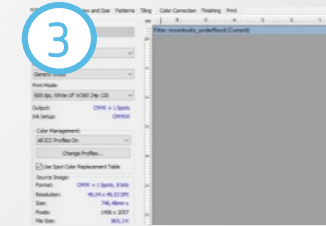
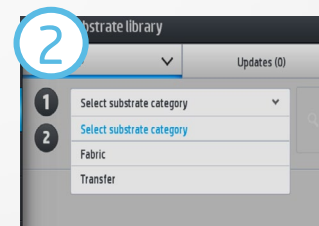
Certification process

Materials

How to produce face masks

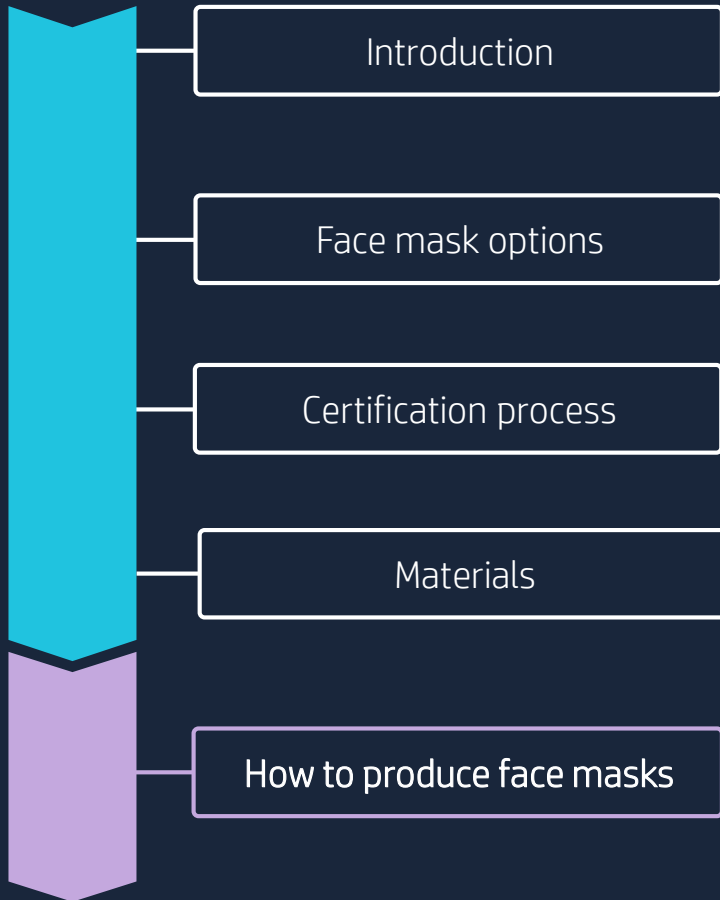
## PRINTING PROCESS

1. Load the substrate on the printer as Transfer Paper > Generic 70 to 110 gsm paper (the recommended one); a different generic preset can also be used if your transfer paper has a higher or a lower grammage (for instance: 45 to 70 gsm, >110 gsm).
2. Follow the loading process. As a recommendation, click the Media Loading Accessory checkbox.
3. Select the right media preset – using a generic or a recommended profile from the front panel or the Media Locator webpage\* (filtering by application), then select the preferred print mode from the ones offered, and send.
4. Prepare the job, n° of copies, size, nesting several images...



\* See the post-processing recommendations that can be found in this document to get the best results.

# HOW TO PRODUCE FACE MASKS



## ADDITIONAL RECOMMENDATIONS

### TACKY vs NON-TACKY PAPERS

Tacky: Use to prevent image quality issues like ghosting due to media movement (either the paper or the fabric). Non-tacky: Depending on the coating, some papers release better the sublimation vapors, so issues like gassing out can be solved.

### AMOUNT OF INK

Although the recommended percentage of ink is already set in the offered media presets, for those customers that want to use a higher level of ink, the recommendation is to verify that the selected amount of ink does not create cockling on the paper and that the ink is fully dried.

### CALENDER SETTINGS

The recommended range of temperature is 190-200°C (use lower temperatures for lighter fabrics with a higher percentage of elastomer) and 35-55 seconds of dwell time.

# HOW TO PRODUCE FACE MASKS

Introduction

Face mask options

Certification process

Materials

How to produce face masks

## CALENDERING PROCESS – PRE-CUT PIECES





# Thank you!

We didn't invent dye-sub. We reinvented it.  
Say hello to HP Stitch.

