

# FAST MASKS

## NECK BUFF/GATOR HEPA FILTER MEDICAL MASK



**NO SEWING, EASY TO MAKE, STERILIZE & REUSE, COMFORTABLE,  
COMMON AVAILABLE MATERIALS**

### INTRODUCTION

These notes provide instruction on using a “Neck Buff”, or “Neck Gator” as a mask, with HEPA filter material to minimize the aerosol risk of COVID-19.

This simple guide shows how a common item are used to quickly create Fast Mask. Fast Mask provides front-line medical professionals and others, protection from splash and aerosolized virus transmission, when certified Personal Protective Equipment (PPE) is unavailable.

***Please note, while Fast Mask can lower the risk of contagion from aerosolized COVID-19 virus, this device has not been evaluated, tested, or certified to assure N95 mask standards. The design features are believed to substantially reduce the probability of transmission.***

### Cleaning Notes:

Masks can be cleaned in steam pressure cookers (35-45min @ +245F) or autoclaves, providing repeated protection once cleaned. Change/ clean mask after 2 -3 hours of continuous use.

***IF YOU CAN GLUE AND YOU CAN CUT PAPER YOU CAN MAKE THIS MASK!  
PLEASE DON'T LET THE WRITTEN INSTRUCTION SCARE YOU, FOLLOW THE  
PICTURES!***

***WATCH THE YOUTUBE VIDEO! <https://youtu.be/lqWCER7IroQ>***

### PRODUCTION

- No sewing is required, but there is a little measuring, cutting and gluing.
- It is recommended to make the masks in an assembly line process. Making one at a time takes about 6 – 8 minutes. In an assembly line process that would produce 20 to 30

masks, 3 to 4 minute per unit is practical, especially with several people working together. Gather a few friends and stay 6 feet apart while making them.

- If you do not have neck buff/gators and it is too expensive to purchase, you can use old tee-shirts cotton polyester blend is best, or all polyester (old 5k/10k road race shirts would work). Must be stretch material. You should test to make sure silicone bonds to it if it is not polyester, or use 3M 5200 marine sealant, which will bond to just about anything, permanently. (Note: 5200 cures best in humid environment)

## MATERIALS LIST: (See Material Resources Below)

- **NECK BUFF (10" x 20"):** Purchased in many places, Hoorag is shown here and have provided support for this design project, since supplies will be limited, please use them as an example, but other products and resources may work as alternatives
- **HEPA FILTER MATERIAL (6" x 4.5"):** HEPA Vacuum bags were selected that fit a certain vacuum, many other alternatives are available. The ones in example here can be cut into 78 filters per total from the two bags included as one order.
- **NOSE BRIDGE (Length 4" – 4.5"):**
  - Needs to be easy to bend, yet holds shape to form a seal around the nose
  - **Aluminum (AL)**
    - 1mm x 4mm x 100mm to 1.5 mm x 3mm (1/16" x 1/8")
    - AL stock specified in "mm" can be found in long lengths at art outlets as "Aluminum Flat Wire". It is used in jewelry and other crafts.
  - **Hay bailing wire, or Tie Wire** (for tying rebar): found at most hardware stores Two pieces, side by side, sufficiently strong yet easy to bend.
- **SILICONE GLUE/ SEALANT:** Medical Grade Silicone recommended for any silicone touching skin.
  - **GE Clear 100% Silicone**, or similar that is fast drying and "Water Ready" in 30 min (See photo). This means it will dry to the point that it can be worked with at that point. Requires 24 hours for total cure before use against skin (Not Medical Grade)
  - **3M 5200 Marine Sealant:** This is a little messier and you will need acetone to clean up while it is still soft. This is quite permanent, but really strong and bonds anything.
  - **Medical Grade Silicone: Momentive Red RTV116 FDA Silicone Sealant.** It is best to use medical grade silicone against your skin. Please look around for options: Specs: Medical Grade, operating temp min 260F (130C), Self-leveling best for flat seals

## MATERIALS and RESOURCES

- **Neck Gator/ Buff Resource:**

- **Hoorag:** *Example of one of many retail resources online.* Thanks Hoorag for providing samples for making prototypes!  
On Hoorag website, look at the top of the screen you will see “Bulk Orders”.  
[https://www.hoorag.com/?gclid=EAIaIQobChMIz5WjyKyz6AIVF2yGCh0cpAGdEAAYASAAEgJKvvD\\_BwE](https://www.hoorag.com/?gclid=EAIaIQobChMIz5WjyKyz6AIVF2yGCh0cpAGdEAAYASAAEgJKvvD_BwE)
- **MAKE YOUR OWN:** Elastic/ stretch tee shirt material, Polyester, polyester/cotton blend, make 10” wide tube, 20” long, glue seam(s) with silicone to form tube.
- **HEPA Filter Material:** Examples given, alternatives may be required; HEPA 13 or 14
  - **Vacuum Bags:** (HEPA 95 standard with 0.3um (micron) filtration, MERV 16 AC filters, or better also available) found at Amazon Home Depot, etc.:  
[https://smile.amazon.com/gp/product/B007ULBB4Q/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o00\\_s00?ie=UTF8&psc=1](https://smile.amazon.com/gp/product/B007ULBB4Q/ref=ppx_yo_dt_b_asin_title_o00_s00?ie=UTF8&psc=1)  
  
[https://www.homedepot.com/p/Vacmaster-HEPA-High-Efficiency-Dust-Bag-VKCB001/203491849?MERCH=REC-\\_pipsem-\\_204477760-\\_203491849-\\_N](https://www.homedepot.com/p/Vacmaster-HEPA-High-Efficiency-Dust-Bag-VKCB001/203491849?MERCH=REC-_pipsem-_204477760-_203491849-_N)
  - **AC Filters:** AC filters that meet the HEPA standards, but the bags seem are easier to work with
- **Nose Bridge Metal:**
  - **Orange Aluminum**  
1/6” x 1/8” (1.5mm x 3mm): Note: Thank you **Orange Aluminum** for expediting material!  
<https://www.orangealuminum.com/rectangular-bars-oa9258-6m.html>
  - **Fire Mountain Gems and Beads (Easiest to use)**  
1mm x 4mm: Craft aluminum sources, make sure suppliers in the US, or delivery times will be very long, other suppliers in China.  
  
<https://www.ebay.com/itm/Flat-Aluminum-Wire-Wrapping-Jewelry-Craft-Mask-Making-4x1mm-Color-18ft/400527330745?hash=item5d414a0db9:m:mkR1bCprem7OcPbutABP0Sw>  
  
[https://www.firemountaingems.com/itemdetails/H202109WR?gclid=EAIaIQobChMI0o2XkM\\_E6AIVS9yGCh2zwc3EAQYAyABEgIGlvD\\_BwE](https://www.firemountaingems.com/itemdetails/H202109WR?gclid=EAIaIQobChMI0o2XkM_E6AIVS9yGCh2zwc3EAQYAyABEgIGlvD_BwE)
  - **Hardware Stores:** Tie Wire (for rebar tying), Hay Bailing Wire
- **Silicone Sealant (Tube various sizes):** Hardware Stores (Home Depot, Walmart, etc.)

## TOOLS LIST and PREPARATION

- **Large open table to work on.** Cover to protect as needed, cutting and gluing will be occurring.
- **Areas to stage** drying HEPA filters and Neck Gator/Bufs
- **Tin snips** to cut metal nose bridge, **Scissors** should work for thinner metal 1/32" (1mm)
- **Sandpaper** 100 grit to deburr edges of freshly cut metal
- **Ruler, or tape measure** (Dimensions given in metric and ASE for ease of production)
- **Very fine tip pen (Sharpie)**, or pencil to mark fabric (HEPA and Gator/Buff)
- **Long straight edge:** Yard stick, or other straight edge for drawing cutting lines on HEPA Filter material.
- **Scissors** to cut HEPA filter material
- **Wax paper:** Place inside of Gator where silicone could stick together to other side, flattening silicone seal around nose and cheek area
- **Towels, or paper towels:** Clean silicone off things constantly or it could get messy in production
- **Mineral Spirits:** Cleans silicone sealant off unintended areas and fingers
- **Latex/ Nitrile gloves** (optional) for protecting fingers from silicone

## Procedure

### Nose Bridge

- 1) Cut AL, or wire metal in 4" – 4.5", or 100mm – 115mm lengths
- 2) Using sandpaper (100 grit or finer), deburr the ends of the freshly cut metal
- 3) For wire nose bridge, tape 2 wires together at the ends with small piece of masking tape  
See Figure 1: Nose Bridge PiecesFigure 1.
- 4) Mark center point for later reference and set aside for assembly



Figure 1: Nose Bridge Pieces

## Filters

- 1) Mark out pattern on vacuum bag to cut HEPA filter material into 6" x 4.5" rectangles. These vacuum bags should yield approximately 38 - 39 mask filters per bag based on the area of the bag material. Other bag types may yield a different amount. Select a cutting pattern that yields the most filters for the bags chosen. See Figure 2 below for marking pattern on the VacMaster bag chosen here.

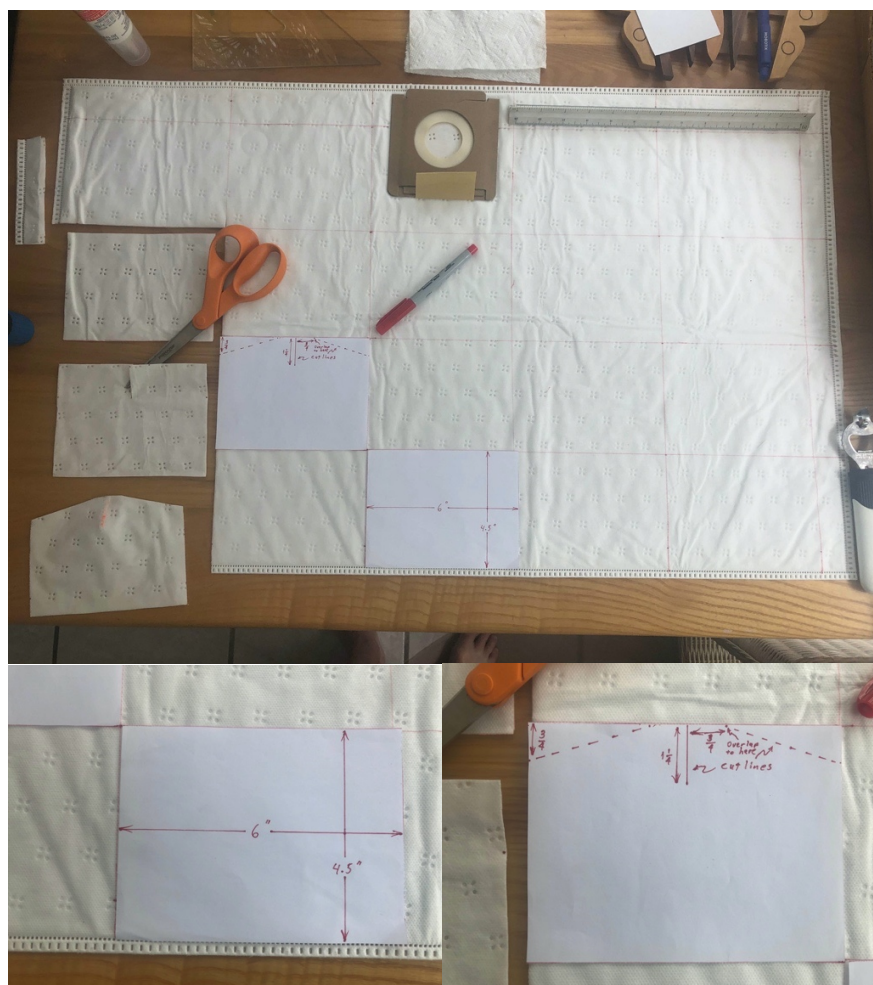


Figure 2: HEPA Filter cutting patterns

- 2) Referring to patter shown in Figure 2, Mark filter TOP center and 1.25 – 1.5" vertical cut line used to pleat filter for nose relief
- 3) Mark edges approx. .75" below Top as shown in template and trim.
- 4) Silicone area to right of center cut and overlap cut edge from left to right and secure with binder clip as shown in Figure 3.



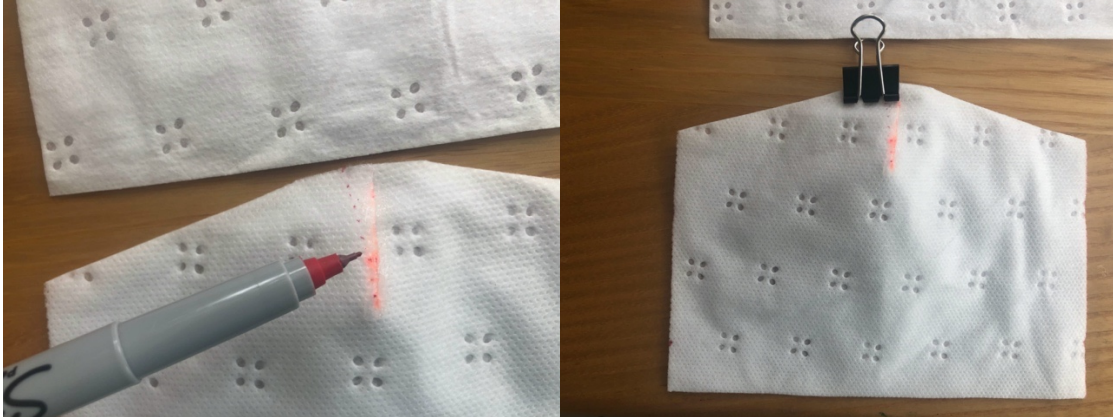


Figure 3: Pleated Filter with Binder Clip, Apply additional silicon on overlap edge

- 5) Apply additional silicone along edge of over overlapped material as shown in Figure 3
- 6) Allow to dry for 30 minutes before assembly into mask

#### Buff Assembly

- 1) Referring to Figure 4 below, place buff with “Top” upward on flat surface, roll top and bottom of buff approx. 1.25 – 1.5” down from top and bottom to form “cuff”

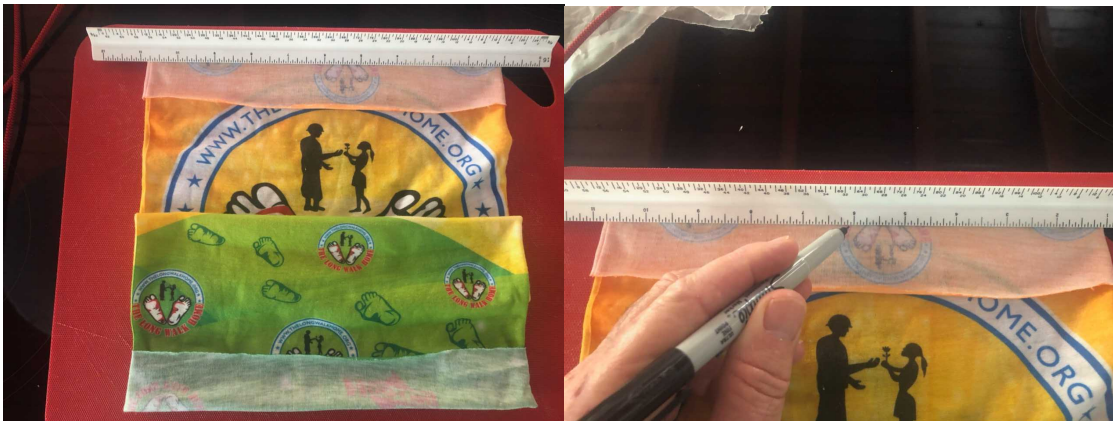


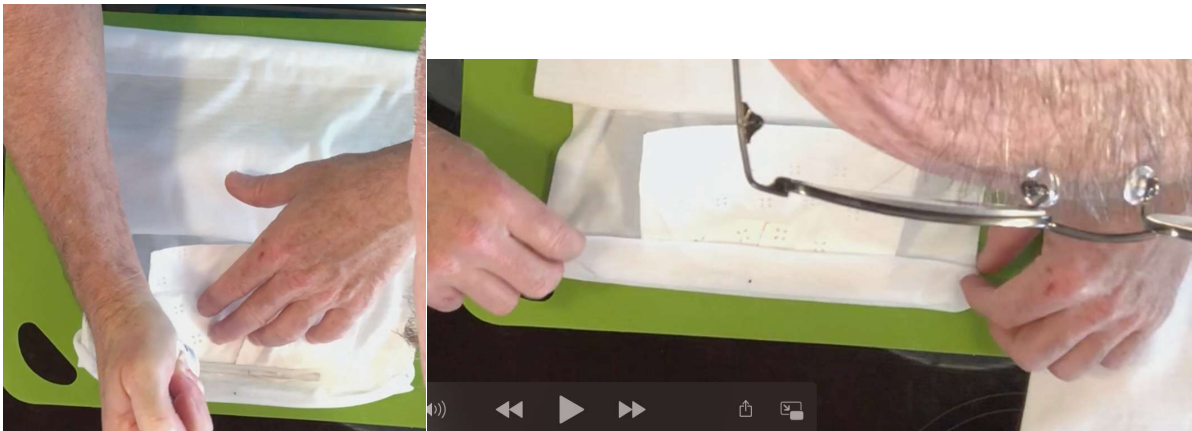
Figure 4: Cuffing and Marking Gator/Buff Top and Bottom

- 2) Mark top center of Buff as in Figure 4 (this is front side) and flip buff so back side is up
- 3) Secure top and bottom cuffs by depositing silicone bead on the buff about 1/4” shorter than the cuff edge, then pressing cuff edge together with body of the buff assuring silicone penetrates well into both portions of the fabric



*Figure 5 Silicone bead all cuff edges, press together back then front bottom*

- 4) Flip Buff over to front side and repeat step 3 for the bottom
- 5) For the top, lay a bead line at the edge of the cuff like the other portions
- 6) Evenly on either side of the center mark made earlier, lay a bead line  $1/8'' - 1/4''$  from fold of the cuff as wide as the HEPA filter roughly 5 – 6" (3" either side of center point)
- 7) Center Top of HEPA filter, assuring it touching the fold of the cuff as in Figure 6



*Figure 6: Filter and Nose Bridge assembly*

- 8) Deposit a bead line on top of HEPA filter about  $1/4''$  below cuff fold to secure nose bridge (See Figure 6)
- 9) Place nose bridge on silicone bead line and cover all edges and tope with  $1/16'' - 1/8''$  of silicone to encapsulate. See Figure 6
- 10) Press top cuff together with nose bridge and filter assuring silicone is pressed into fabric. Assembly should be snug but does not require extreme amount of pressure. Figure 6



#### Optional Seal:

Note: Not required, but this helps prevent unintended gaps that could result in air flow around filter instead of through it. You should test if commercial silicone, once cured 24 hours, may still irritate sensitive facial skin. If so, do not form the seal, or use medical grade silicone for seal.

- 11) Fold front top edge of assembled buff filter towards bottom of buff to lay beam line for silicone seal area as shown in Figure 7



Figure 7: Forming Thin Silicone Nose Seal, Then Flattening

- 12) Lay thin bead 1/4" below top front edge on the inside. It is best to lay a thin bead line down across nose bridge area. See Figure 7
- 13) Using a smooth piece of plasticized cardboard (a business card, clean edge immediate after with paper towel), gently flatten/ smooth the silicone, so the seal will lay smooth against the skin, shown in Figure 7
- 14) A full seal can be formed around nose and mouth area if desired. As shown in Figure 8.



Figure 8: Forming full inhalation area flattened thin seal

- 15) Permit the Fast Mask to cure for 30 minutes minimum before packing or storing.



- 16) The silicone seal requires 24 hours of curing before solvents have evaporated and it is safe to use against sensitive facial skin

### Cleaning

- A chlorine bleach wash in the laundry on GENTLE CYCLE (make sure of your concentrations <https://www.weforum.org/agenda/2020/03/clean-kill-coronavirus-covid19-safety-health/>)
- Modern steam pressure cooker should work if it is held at about 245 degrees for 35-40 minutes per cleaning.
- Autoclave
- Air Dry, or low heat, delicate cycle

### STANDARDS FOR HEPA FILTERS

Standards: HEPA 13 and 14 preferred, HEPA 12 and 11 if necessary, but no lower. (see chart at end of this document)

Usage	Class	Performance	Performance test	Particulate size approaching 100% retention	Test Standard
Coarse filters (used as Primary)	G1	65%	Average value	>5 µm	BS EN779
	G2	65–80%	Average value	>5 µm	BS EN779
	G3	80–90%	Average value	>5 µm	BS EN779
	G4	90%–	Average value	>5 µm	BS EN779
Fine filters (used as Secondary)	M5	40–60%	Average value	>5 µm	BS EN779
	M6	60–80%	Average value	>2 µm	BS EN779
	F7	80–90%	Average value	>2 µm	BS EN779
	F8	90–95%	Average value	>1 µm	BS EN779
	F9	95%–	Average value	>1 µm	BS EN779
Semi HEPA	E10	85%	Minimum value	>1 µm	BS EN1822
	E11	95%	Minimum value	>0.5 µm	BS EN1822
	E12	99.5%	Minimum value	>0.5 µm	BS EN1822
HEPA	H13	99.95%	Minimum value	>0.3 µm	BS EN1822
	H14	99.995%	Minimum value	>0.3 µm	BS EN1822
ULPA	U15	99.9995%	Minimum value	>0.3 µm	BS EN1822
	U16	99.99995%	Minimum value	>0.3 µm	BS EN1822
	U17	99.999995%	Minimum value	>0.3 µm	BS EN1822

### Sewn Masks

Here is a video of a friend, Andy S, who has designed sewn masks and uses the AC filter <https://www.youtube.com/watch?v=McXB9nEpGf8&feature=youtu.be>

Thanks Andy for the video and great work!!

### Call to Action

Please everyone who can reach out to Hospitals, Nursing Homes, Clinics, Community Officials and Staff, Red Cross, to inquire who may be in need substitute masks with filtration! While these

are not certified to perform as well as N95 masks, they improve the odds for medical front-line medical professional, versus using surgical masks that are commonly being sewn by many people trying to help. If they are not needed, then it is a piece of memorabilia! If they are needed, you could be a life saver!

The general guidance is changing where the CDC is likely be advising that we commonly wear masks too. A doubled-up Neck Gator/Buff may be sufficient for most of the general public, easier to obtain than a sewn surgical mask, comfortable to wear and protect your face and neck against sun damage.

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