

## ***eSpin COVID-19 Response***

**McIlvaine Webinar**  
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President

## Introduction

Severe shortage of PPE across the country

eSpin leverage its electrospun nanofiber manufacturing to produce filter media

HEPA experience

## Impact

Global interest in nanofibers for PPE

Increased customer base

Introduce new products



## Rapid Deployment: Mask media

- Nanofiber media production
  - 3 layer structure (Halar®+PVDF+Spunlace)
  - 3 layer structure (needlepunch+PTFE+Spunlace)
- 95% efficient @0.3μm, 85LPM
- Hydrophobic
- Superior breathability
- Washable, re-usable
- Test media per NIOSH standards
- 300,000 masks/day production

## Rapid Deployment: HEPA filter media

- Demand for Powered Air Purifier Respirator (PAPR) filters
- Produce 99.97% efficient media
  - 2 and 3 layer laminated structures
- Test media per EN1822 for HEPA performance
- Integrate nanoparticles in media for improved performance
  - Anti-viral

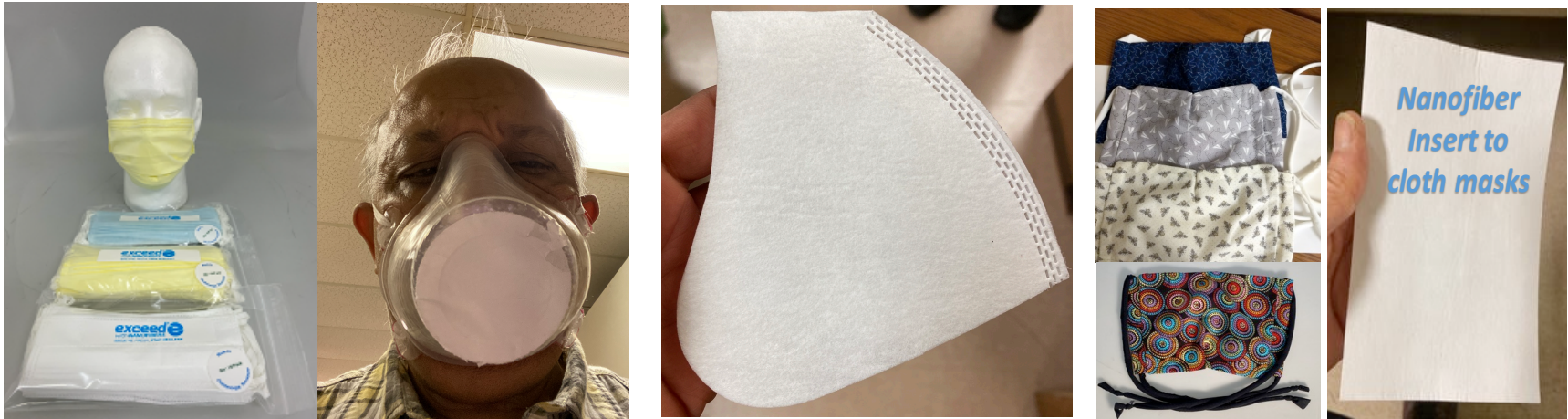
# Surgical Face Mask Production

- Rapid prototyping of Pleating process
- Purchase automated sonic bonding machine
- Develop surgical face masks using nanofiber
- Test face masks per ASTM 2100



# Nanofiber Inserts-Die Cuts

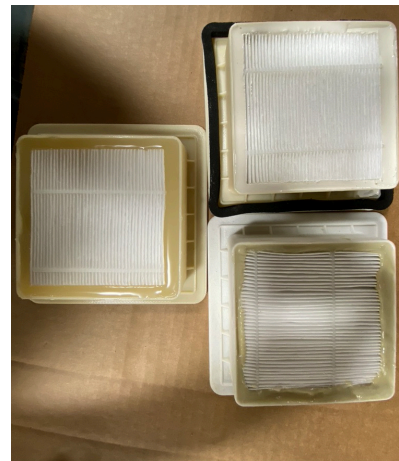
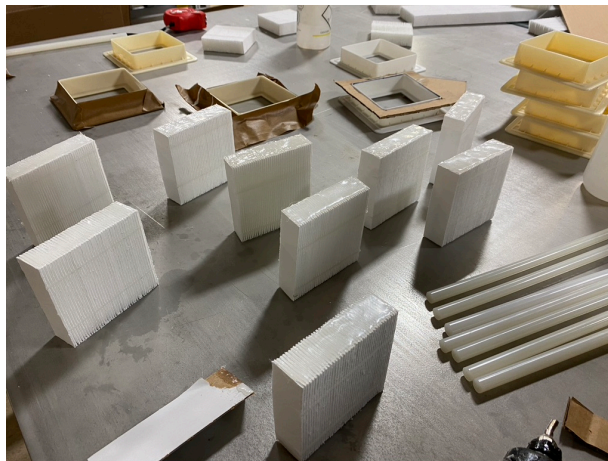
- More demand for media, masks, and insert
- Dedicate 3 additional spinning machines
- Sign long term media supply agreement





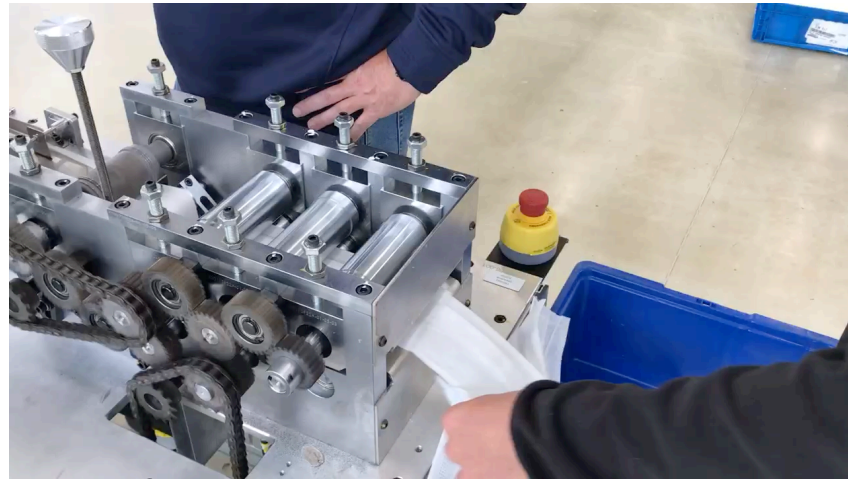
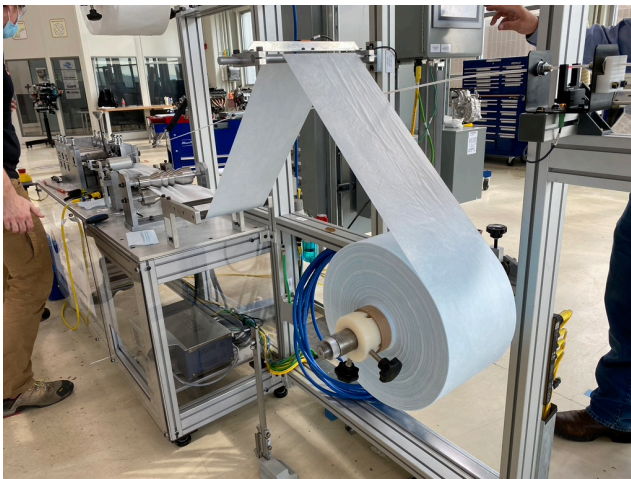
# Mini-Pleat Filters

- Form relationship with a Corporation to make HEPA filter for powered air purifier respirator (PAPR)
  - Media Pleating
  - Selection of Adhesive
  - Frame development and rapid prototyping
  - NIOSH Test



# Automated Surgical Face Mask manufacturing

- Form relationship with large Automotive to make surgical face masks
  - Partner invests in mask machine
  - eSpin to provide 95% efficient media
  - Production > 60,000 masks/day
  - Apply for NIOSH approval





# Growth

- As a result of COVID
  - increase in work force
  - 24/7 operation
  - Increased nanofiber production capacity
  - Able to supply media to new customers
- Increased use of analytical tools
  - Air Flow, Pressure drop, Filter efficiency
  - Wind duct, Porometer
  - Electron Microscopy
  - Chemistry (FTIR, Mass Specs, TGA, DSC)

Thank you

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