

Breakout Session I: New Materials & Designs



What material properties should be considered for the next generation of better fitting respirators?



- Environment in which the device is used
 - Temperature Variation
 - Degree of Contamination
 - Material Environment Interaction
- Material Properties
 - Mechanical
 - Chemical
 - Physical
 - Degradation
 - Comfort
 - Thermal Conductivity
 - Transparency
 - Compatibility with other parts of device
 - Cost
 - Sound
 - Biocompatibility
 - Sustainable/Recyclable
- Material Environment Interaction

What design properties should be considered for the next generation of respirators?



- Safety and Comfort Go Together
- Uniform Pressure Distribution on Face
- Position of Respirators
 - Maximize Area of Contact
- Role of Straps
- Weight of Materials
- Number of Seals/Seal Design
- Easy to Clean and Decontaminate
- End of Life Indicator
- Shelf Life/Aging Properties
- Different Face Profiles
- Novelty of Interaction
- Does not impair field of vision

➤ Key Point

- Work Environment-Specific Requirements

- Health Care Workers No Exhalation Valves, Visually Appealing
- Construction Workers UV Exposure
- Industrial: New Risks-Complex Paints, Temperature Distribution

➤ Novelty of Users

- Donning Indicator

➤ Storage/Portability

➤ Communication

➤ Multiple Donning

➤ Minimize Number of Parts



Is a “one size fits all” respirator possible?



- Varied Opinions
- Key Point:
 - Adjustable Size : By User
- Mouth Bit Respirator
- Inflatable Seal
- Regulatory Issues Vs. Technology

Research Topics



- Investigation of New Materials and Technology
- New Design
- Concept of Making Mold and then Using Liquid Silicone
 - CAD/CAE/Rapid Prototyping
- Infection Rates in ER: Determine need for and Degree of Protection
- Reusable Respirator
- Decontamination
- Cross Contamination by Repeat Use of Mask
- Selective Biocide Coating on Respirator
- Sensors
- NIOSH/Manufacturer/User Collaboration
- Investment in Use vs. Cost in Non-Use