

Background



Severity of wildfires has increased in recent years due to climate change

Wildland firefighters inhale dust, ash, and soot, which cause negative respiratory conditions



No dedicated respiratory technology that meets wildland firefighting needs

Objectives

1. Meets NFPA & OSHA Standards:

- ✓ Environmental resistance: heat (150°F), water resistant (IPX3), & impact

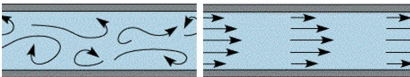
2. Fulfills customer requests:

- ✓ Compatibility: compatible with existing gear, face shapes, & tasks
- ✓ Experience: lightweight (<2.5 lbs), no facial contact, quiet (<90 dB)
- ✓ Price: \$80 per unit
 - \$42.50 to manufacture

3. Core functionality objective:

- ✓ Produces air curtain that deflects particles in 10 mph headwind for 4+ hours
 - Particle deflection
 - No entrainment

✗ Turbulent ✓ Laminar



On-Off Switch

- Intuitive
- Out of the way

Particle Filter

- ~25 μ m

40mm Tubeaxial Fan

- 18.4 CFM
- 3.7 Watts

Loc-Line Hose

- Fits all face shapes
- Adjustable length

On-Helmet



Battery Pack

- 8 AA's = 12V
- Water resistant

Rectangular Outlet Nozzle

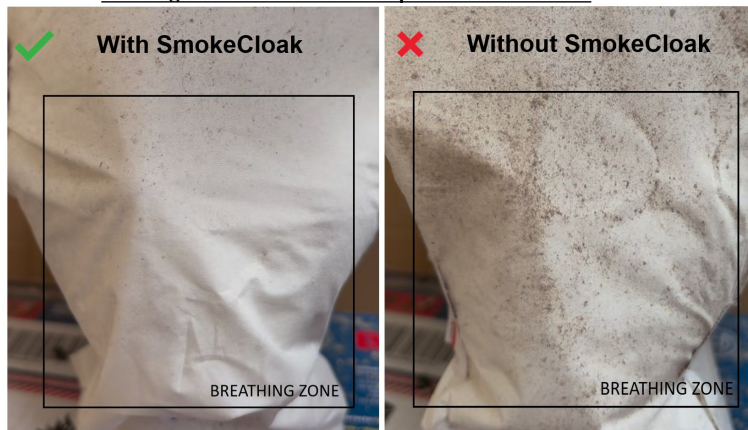
- Adjustable outlet angle
- Ideal range 30-45° from face
- Designed for laminar flow

Helmet-Mount Buckle

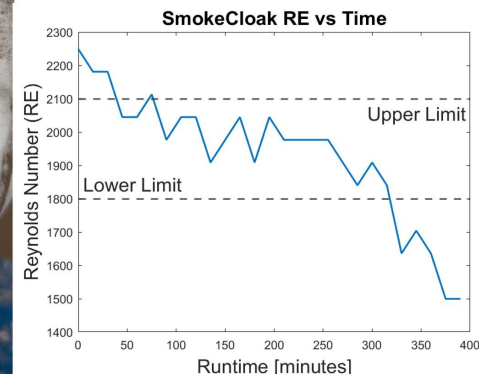
- Bonded with DP8010 ScotchWeld
- Easy attachment

Test Results

Blowing ash & dust with 10 mph direct headwind



Want: 1800 < Reynolds Number (RE) < 2100



User Impact

"We don't wear respirators or anything... Do they make them? Yeah. But it gets so hot, you can't breathe."

~BMFPD Chief John Benson

Easy to Use

Adaptable & Versatile

No Vision Obstruction

Future Work

- **Refine & expand design**
 - Multiple helmet styles
 - Higher operable windspeed
 - Finer particle filtration
- **Move to injection molding**
 - \$100k initial investment
- **Secure contracts & partnerships**
- **Expand to secondary markets**
 - Construction
 - Civilian