

Mask Fitting - M41 PATS

Protective Assessment Test System



Presented by: Jason Adamek
RDECOM, Test Technology Engineering
Team

DSN: 584-2839

Comm: 410 436-2839

jason.adamek@us.army.mil



M41 PATS

- Commercial Off-the-Shelf Device That Measures How Well a Protective Mask Fits a Soldier's Face.
- Tests the Seal Between the Mask and the Soldier's Face.
- Provides a Quantitative Indication of Mask Fit in Minutes.
- Rugged, Portable, Durable for Field Use.



M41 PATS - What Does It Do?

- Samples Air Inside the Mask and Outside the Mask.
- Counts Particles in the Air (0.02 – 0.2 micron range).
- Calculates Fit Factor as Follows:

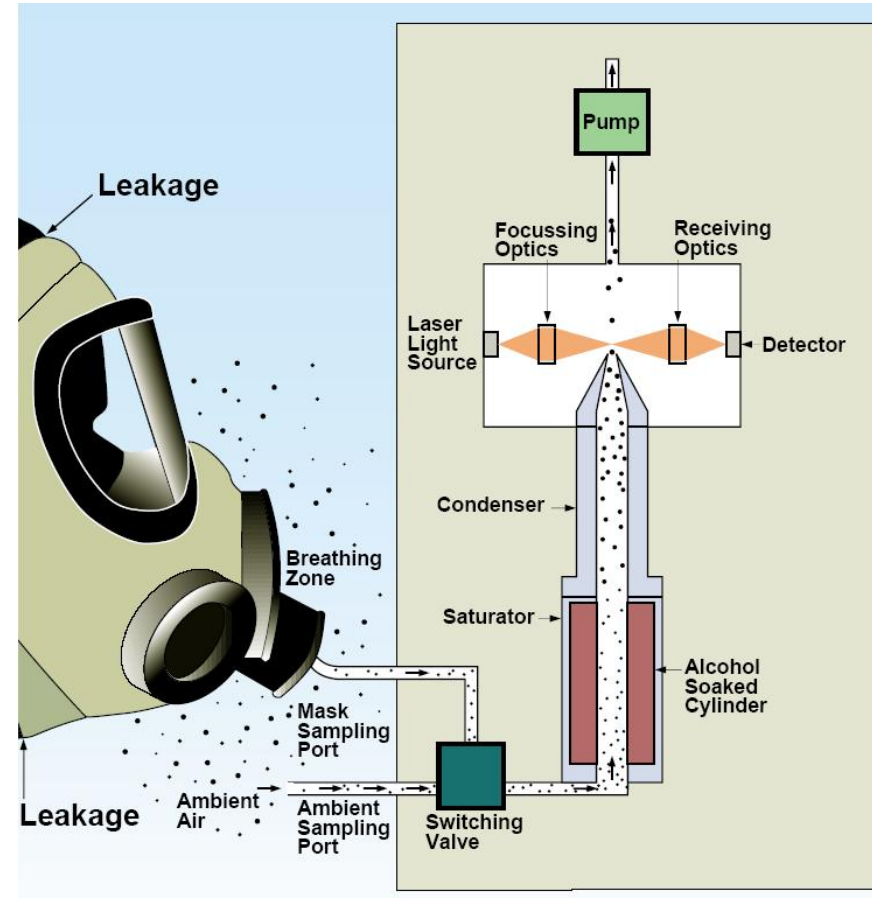


$$\text{Fit Factor} = \frac{\text{Concentration Outside Mask}}{\text{Concentration Inside Mask}}$$



M41 PATS - How Does It Work?

- Condensation Nucleus Counter (CNC).
- Condenses Evaporated Alcohol on Airborne Particles.
- Alcohol Droplets Scatter Light from Laser Source.



M41 PATS – Benefits to the Military

- Verifies That Soldiers Are Getting The Best Possible Protection From Their Assigned Mask.
- Helps Assign Properly Sized Masks.
- Instills Confidence in Soldiers That Their Mask Protects Them.



M41 PATS - Background

- Manufacturer: TSI Inc., Minneapolis, MN - sole source contractor
- Quantity: 11,135 units across the Services
- Users: Army (9897), Air Force (635), Marines (469), Navy (19), other (115)
- Unit cost: \$6374 (FY05)
- Support: Organic - Redstone, AL, and Parmesans, Germany
- History:
 - Type classified limited production (urgent) - Dec 1990
 - Type classified - Oct 1993
 - Production initiated - FY93
 - Follow-on contract - FY03



M41 PATS - Specs

Specifications

Size

Instrument	240 mm × 190 mm × 140 mm
Carrying case	410 mm × 380 mm × 250 mm

Weight

Instrument	1.9 kg
Carrying case	10 kg

Fit factor range 1 to greater than 50,000

Particle concentration range 0.01 to 500,000 particles/cm³

Particle size range 0.02 to greater than 1 µm

Test duration (per exercise) 40 seconds

Power requirements

AC	115 VAC or 230 VAC, 50/60 Hz, dual-voltage AC power supply
Battery	Optional

Temperature range

Operation	0 to 38°C
Storage	-40 to 70°C

Sample flow rate 0.7 lpm (nominal)

Alcohol

Hours of operation per charge	8 hours at 21°C
Alcohol type	Reagent grade isopropyl

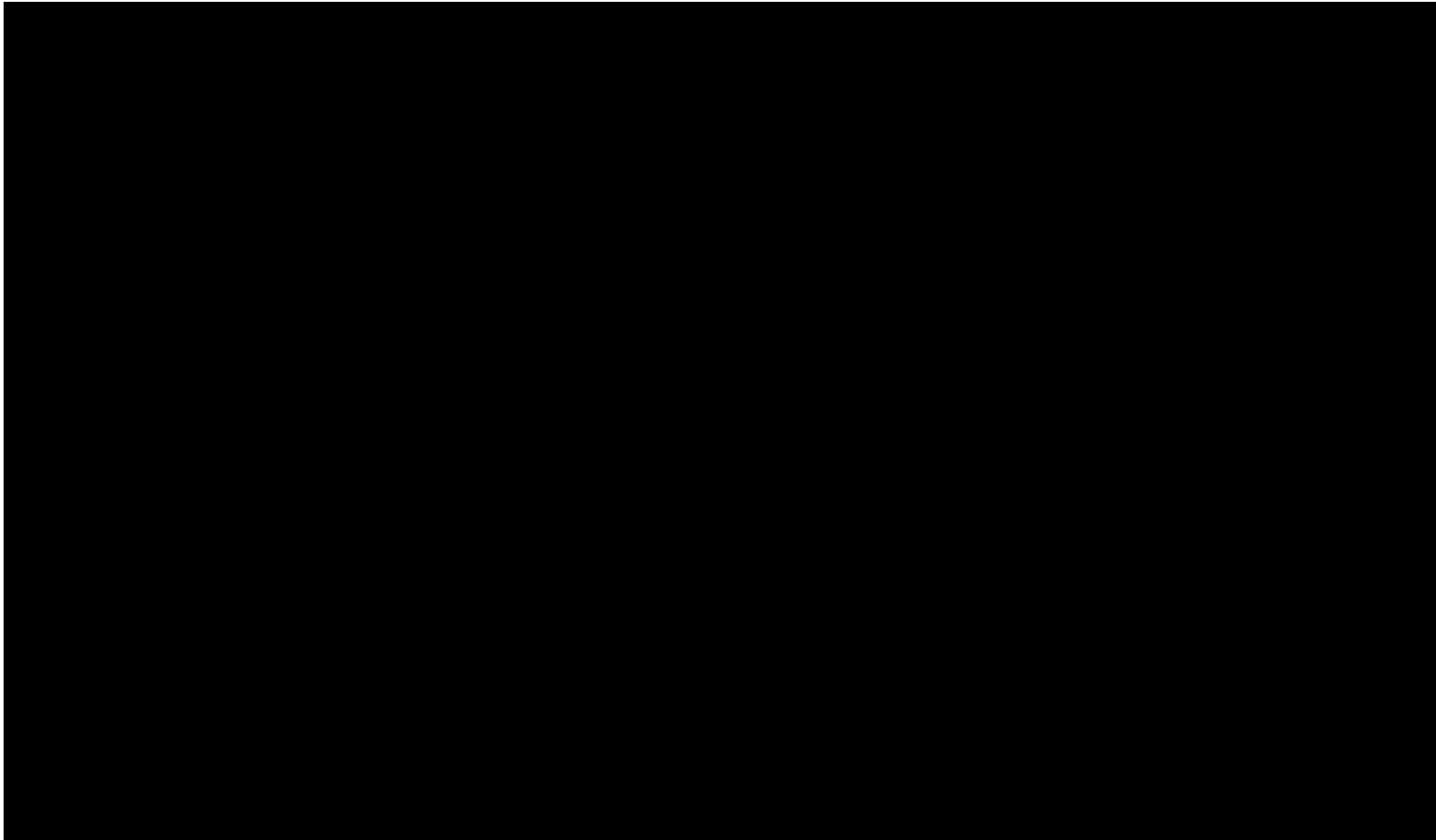
Pass/fail settings User-selectable

Factory recalibration interval One year

Warranty One year on workmanship and materials



M41 PATS - Video



M41 PATS – Recent Developments

- Operations and Support Cost Reduction effort to reduce costs associated with the non-rechargeable lithium manganese dioxide battery.
- Created an alternative alkaline battery pack that uses 8 standard D-cell batteries.
- Potential savings of \$2.5 M per year.



M41 PATS – Recent Developments

- Operations and Support Cost Reduction effort to reduce costs associated with calibration and maintenance procedures.
- Currently on an 18-month calibration cycle.
- Developing time-of-use meter, total-particles-counted meter, and embedded diagnostics to monitor performance of major components.
- Switch to a more usage-based or as-needed service schedule.
- Estimated cost savings of \$5 Million over 10 years.



M41 PATS

- Questions?

