

Specifications

CBRN Mask Protection Assessment Test System  
Model 8020M

**Size**  
Instrument 9.3 in. x 6.4 in. x 5.6 in. (24 cm x 16 cm x 14 cm)  
Carrying case 16.3 in. x 14.4 in. x 8.3 in. (41 cm x 37 cm x 20 cm)

**Weight**  
Instrument 3.1 lbs (1.4 kg)  
Carrying case 14 lbs (6 kg)

**Fit factor range**  
1 to greater than 50,000

**Particle concentration range**  
0.01 to 500,000 particles/cm<sup>3</sup>

**Particle size range**  
0.02 to greater than 1 µm

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

**Temperature range**  
Operation 32 to 100°F (0 to 38°C)  
Storage -20 to 120°F (-30 to 50°C)

**Sample flow rate**  
0.7 L/min (nominal)

**Alcohol**  
Hours of operation per charge, 8 hours at 70°F (21°C)  
Alcohol type Reagent grade isopropyl

**Recommended factory recalibration interval**  
One year

**Warranty**  
One year on workmanship and materials



**Optional accessories and supplies**  
FitPro+ Fit Test v3.1 Software  
PATI Battery Pack (TSI P/N 803100)  
Pre-Soaked Isopropyl Alcohol Wicks, Box of 50 (TSI P/N 803105)

**Items Included With the 8020M**  
1 - Protection Assessment Test System Instrument  
2 - Alcohol cartridge/fill capsule assemblies  
1 - AC power supply  
2 - HEPA filters for system check  
2 - Twin-tube sampling hoses  
1 - Hard-sided carry case



CBRN Mask Protection  
Assessment Test System  
Model 8020M



Test the fit and integrity of CBRN protective masks, quickly and reliably!

The CBRN Mask Protection Assessment Test System is a portable instrument that tests the fit of a CBRN protective mask on an individual soldier. The test results are displayed as a numerical Fit Factor. The CBRN Mask Fit Tester does not require the use of aerosol test chambers or CS gas chambers to perform the mask fit evaluation. It can be used almost anywhere—at mask issue sites, training facilities, or even in the field.

The fast, accurate fit testing with use of the CBRN Protection Assessment Test System helps verify that personnel are getting the ultimate protection from their masks. It also helps CBRN trainers to quickly identify and correct problems with the fit of a soldier’s mask. The numerical test results can be entered into the personnel files to serve as a permanent record of training. See why this system is already fully deployed by military organizations worldwide.

- Applications**
- Ability to fit test at mask issue sites, training facilities, or even in the field
  - Fit testing of CBRN masks
  - Design evaluation of CBRN masks
- Features and Benefits**
- Gives numerical indication of mask fit and mask integrity
  - Verifies that personnel are getting the best possible protection from assigned mask
  - Provides highly sensitive detection of mask leaks
  - Real-Time Fit Check Mode helps training personnel to quickly identify and correct problems with mask fit
  - Uses programmed exercises to simulate normal field activities
  - Portable, easy-to-use unit operates almost anywhere
  - Runs off AC mains power or battery pack (optional accessory)
  - Includes effective self-test functions

Specifications are subject to change without notice.

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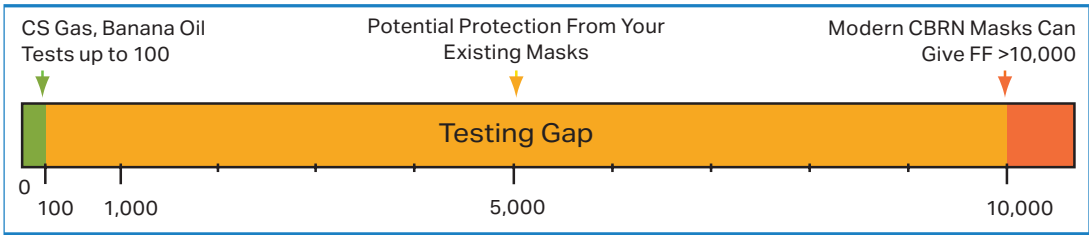
**How Does It Compare With Earlier Mask Fit Test Methods?**

With other fit test methods, such as CS gas chambers, Bitrex®, saccharin, or irritant smoke tubes, the challenge agent concentration is uncontrolled and unmeasured. Sensitivity of the test subject to detect leakage during the test must be relied upon. For such reasons, there is tremendous variability in the PASS/FAIL evaluations using these other fit test methods. Because of this variability, most occupational health and safety regulations only allow their use when the required fit factor is less than 100. Modern CBRN masks are capable of fit factors of more than 10,000. This leaves a testing gap of more than two orders of magnitude.

The CBRN Mask Protection Assessment Test System can accurately measure fit factor ratios of 50,000 or even higher. This fit factor measurement is controlled automatically by the unit. It does not depend on the sensitivity of the test subject to CS gas, Bitrex, saccharin, or irritant smoke. The CBRN Mask Protection Assessment Test System uses microscopic particles which are naturally present in the surrounding air as the challenge agent. The sensor inside the unit compares the particle concentration outside the mask with the concentration inside the mask and then calculates the fit factor. Since the mask's filter canister stops all particles, any particles which are detected inside the mask must have entered through a leak.

**Why Do You Need To Fit Test?**

Modern CBRN masks are capable of a high degree of protection, but ONLY if they fit correctly and are donned properly. A mask that is capable of protection factors greater than 10,000 may only give a protection factor of 50 if it is incorrectly donned or is not the optimum size. The CBRN Mask Protection Assessment Test System is extremely sensitive to mask leakage and can measure fit factors to 50,000 and higher. It is the quickest, easiest way to ensure your masks provide the maximum possible protection of personnel.



**How Hard Is The CBRN Mask Protection Assessment Test System To Operate?**

Operating the unit couldn't be easier — just press the START TEST button on the keypad. The CBRN Mask Protection Assessment Test System automatically runs the fit test protocol while the test subject performs a series of standard exercises. The unit displays the results of each exercise as well as the overall fit test value at the end of the exercise series.

**How the 8020M Works**

The 8020M measures the concentration of naturally-occurring microscopic dust particles in the air and compares it to the particle concentration measured inside the mask. The particles are extremely small, less than 1 µm in diameter, so they are invisible to the naked eye.

In a well-fit CBRN mask, the HEPA layer of the cartridge effectively removes these microscopic particles. If there are no leaks in the mask, the air inside the mask is almost completely free of particles. The primary source of leakage into the mask is the face seal. If the mask fits poorly, it will leak "dirty" ambient air into the mask. The ratio of the particle concentration outside the mask to the concentration inside the mask is an indication of the mask fit. This ratio is called a Fit Factor.

The 8020M alternately samples the air from outside the mask and then from inside the mask by means of an internal switching valve. The sampled air, containing microscopic particles, is first drawn through the middle of an alcohol soaked cylinder. As the sampled air passes through the cylinder, it becomes saturated with alcohol vapor. The air is drawn through a chilled condenser tube. That forces the alcohol vapor to condense on the microscopic dust particles, creating larger alcohol droplets.

These alcohol droplets pass through a nozzle. The light from a laser diode is focused on the outlet of this nozzle. As the microscopic droplets pass through the laser beam, they produce flashes of light. A detector determines the particle concentration by counting the flashes. The 8020M first measures the particle concentration of the ambient air. The valve then switches and measures the concentration inside the mask. This process is repeated for each of the required fit test exercises.

