



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

### Features and Benefits

- Fully deployed by military organizations world wide
- Gives numerical indication of mask fit and mask integrity
- Verifies that personnel are getting the best possible protection from their assigned masks
- Provides highly sensitive detection of mask leaks
- Helps training personnel to quickly locate and correct problems with mask fit
- Uses programmed exercises to simulate normal field activities
- Portable, easy-to-use unit operates almost anywhere
- Includes effective self-test functions

### CBRN Mask Protection Assessment Test System Model 8020M

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.

These fast, accurate fit tests help verify that your personnel are getting the best possible protection from their masks. They also help your CBRN trainers to quickly locate and correct problems with the fit of a soldier's mask. These numerical test results can be entered into personnel files for a permanent record of training.

### 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





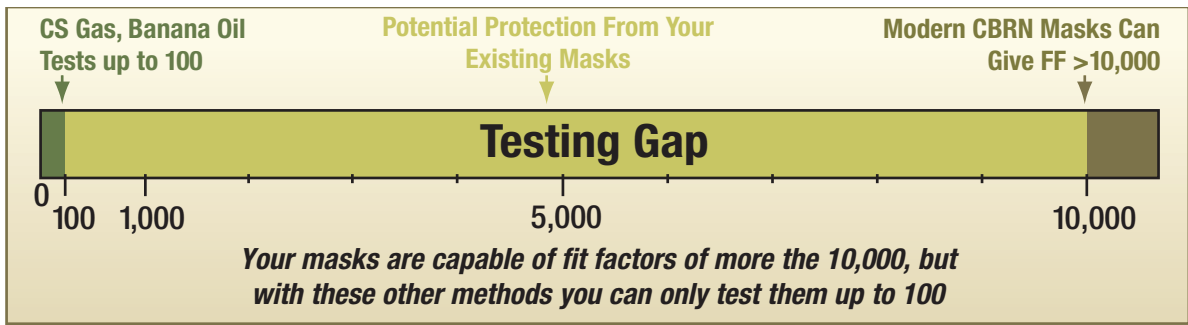
## How Does It Compare With Earlier Mask Fit Test Methods?

With other methods, such as CS gas chambers, banana oil, or irritant smoke tubes, the challenge agent concentration is uncontrolled and unmeasured. You must also rely on the sensitivity of the test subject to detect leakage during the test. For such reasons, there is tremendous variability in the PASS/FAIL evaluations using these other methods. Because of this variability, most industrial 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, banana oil, 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 are fitted correctly and 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 for your 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.

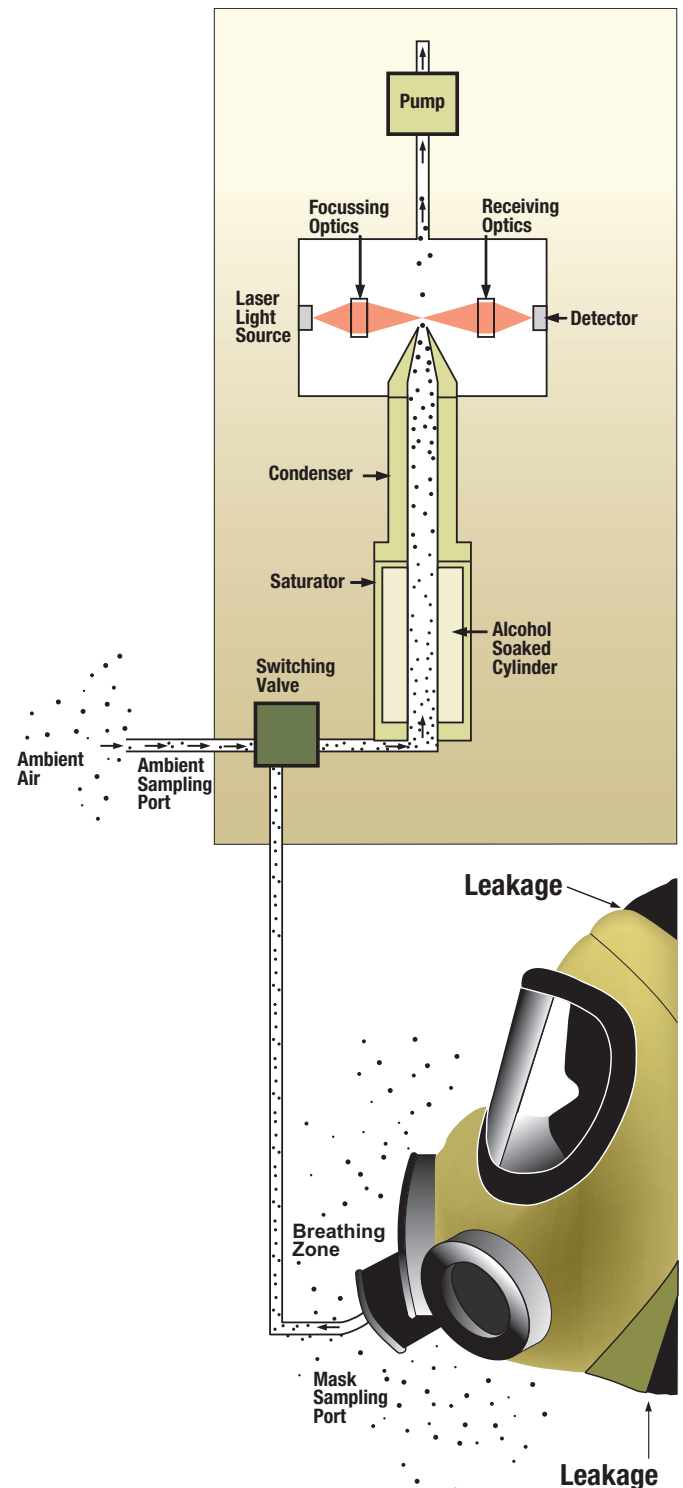
## How the 8020M Works

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  $\mu\text{m}$  in diameter, so they are invisible to the naked eye.

In a well-fitting 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 next drawn through a chilled condenser tube. This cooling forces the alcohol vapor to condense on the microscopic dust particles, creating larger alcohol droplets.

These alcohol droplets then go through a nozzle. The light from a laser diode is focused on the outlet of this nozzle. As the microscopic droplets pass through this 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 it measures the concentration inside the mask. This process is repeated for each of the required exercises.



## Specifications

## Model 8020M

## Size

Instrument 24 cm x 19 cm x 14 cm  
 Carrying case 41 cm x 38 cm x 25 cm

## 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/cm<sup>3</sup>

## 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

## Recommended factory recalibration interval

One year

## Warranty

One year on workmanship and materials

## Optional accessories

FIT PLUS MIL Software Package

## 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



Specifications are subject to change without notice.

**TSI Incorporated** - 500 Cardigan Road, Shoreview, MN 55126-3996 USA

USA	Tel: +1 800 874 2811	E-mail: info@tsi.com	Website: www.tsi.com
UK	Tel: +44 149 4 459200	E-mail: tsiuk@tsi.com	Website: www.tsiinc.co.uk
France	Tel: +33 491 95 21 90	E-mail: tsifrance@tsi.com	Website: www.tsiinc.fr
Germany	Tel: +49 241 523030	E-mail: tsigmhb@tsi.com	Website: www.tsiinc.de



TRUST. SCIENCE. INNOVATION.

Visit our website [www.tsi.com](http://www.tsi.com) for more detailed specifications.