

MASK FITTING TESTER MT-03

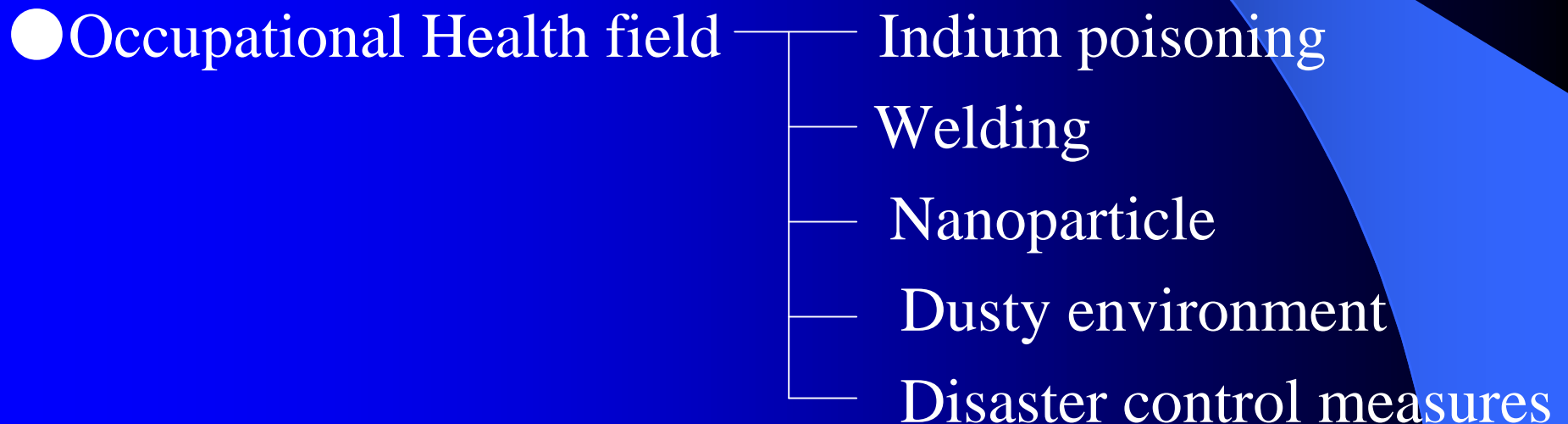
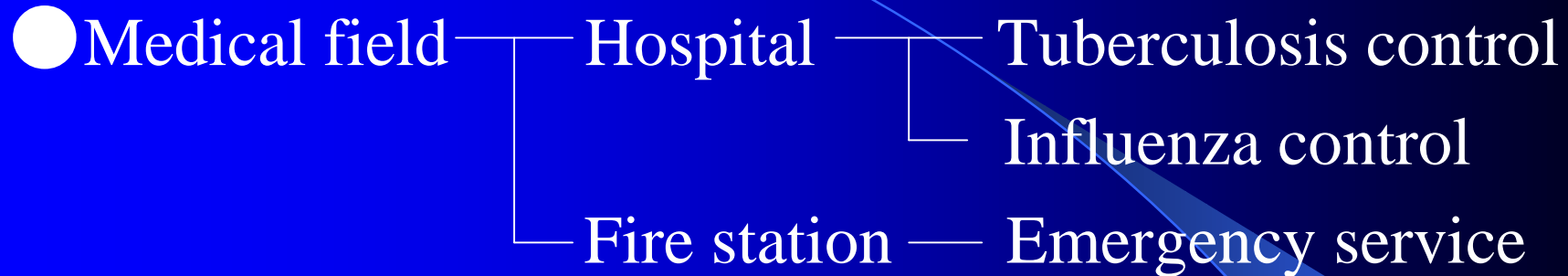


Sibata Scientific Technology Ltd.

What is Mask Fitting Tester

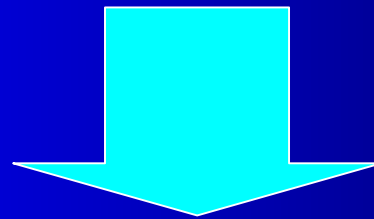
The Mask Fitting Tester is a tester that checks the fitness of a dust mask (disposable or exchangeable) developed with the guidance of The Institute for Science of Labor. The test may be done indoors in a normal room.

Target Market

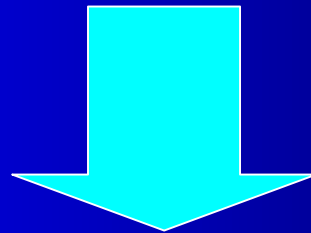


Background in Japan

Masks either not worn or worn improperly at workplaces where high concentrations of dust arise.



Pneumoconiosis



Litigation

- **Shipbuilding industry** -> Indoors, in the context of metal fusion or arc welding procedures, automatic cutting or automatic welding procedures

Tunnel construction work

-> In the context of tunneling construction work inside tunnels, work at places where concrete or other materials are sprayed

- Asbestos

Etc.

Cases of Litigation

Western Japan Coal Pneumoconiosis Lawsuit

New Hokkaido Coal Pneumoconiosis Lawsuit

Eastern Japan Coal Pneumoconiosis Lawsuit

Japan National Tunnel Pneumoconiosis
Eradication Lawsuit

Nagano Asbestos Pneumoconiosis Lawsuit

Mitsubishi Heavy Industries Shimonoseki
Shipyard & Machinery Works Asbestos
Pneumoconiosis Lawsuit

Etc.

History Repeats Itself

Europe and the U.S.A.



Japan



? ? ?



Essentials and Types of Protective Gear(Mask)Wear

Protective Gear is the Last Defense Against Worker Exposure.....



I'm wearing protective gear just because it is an obligation...



Protective gear keeps me healthy !!

Conventional Awareness Regarding the Use of Protective Gear for Occupational Health

Study and data are insufficient

Awareness and education of managers is insufficient with respect to protective gear.

Fitness

Protective gear is only supplied (only instructed by industrial physicians or health supervisors to wear).

Errors are made in the selection of protective gear.

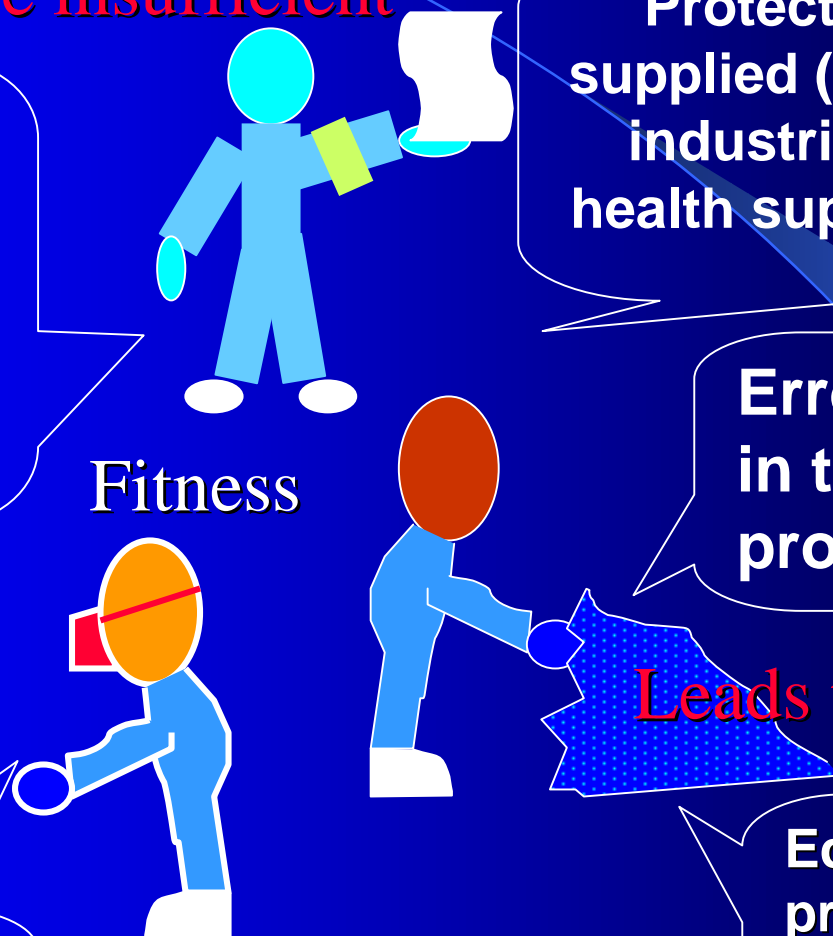
Not worn sufficiently

Leads to exposure

Replacement time are inappropriate

Exceeding the breakdown point

Education related to protective gear is not implemented appropriately.



Types of Masks

Household masks Used to prevent colds and counter pollen, as protection against the cold, and to retain moisture

Medical masks Primarily in medical care settings or for medical use to prevent infections

Industrial masks Used as dust protection measures during work, primarily in factories

Things to Consider When Selecting Filtration Type Respiratory Protective Gear

Dust masks (particulate matter)

- *Filtration material (filter) selection: Trapping efficiency with respect to the size of the particles
- *Leakage from the mask's contact surface with the face (fitness)

Gas proof masks (organic solvents, acids, alkaline materials, etc.)

- *Canister performance, breakdown time with respect to intended material (How well does it trap material?)
- *Leakage from the mask's contact surface with the face (fitness)

Gas proof masks with dust protection (particulate matter with a high vapor pressure)

- *Consider the toxicity when selecting the filtration material
- *Leakage from the mask's contact surface with the face (fitness)

Six Major Check Points When Selecting Masks

1. Before Purchase: Check of materials and functions
2. Before Purchase: Check of shape and size
3. After Purchase: No gap between face and mask
4. After Purchase: Straps should not cause the ears to hurt
5. After Purchase: Breathing should be easy
6. After Purchase: Shouldn't feel stiff or uncomfortable

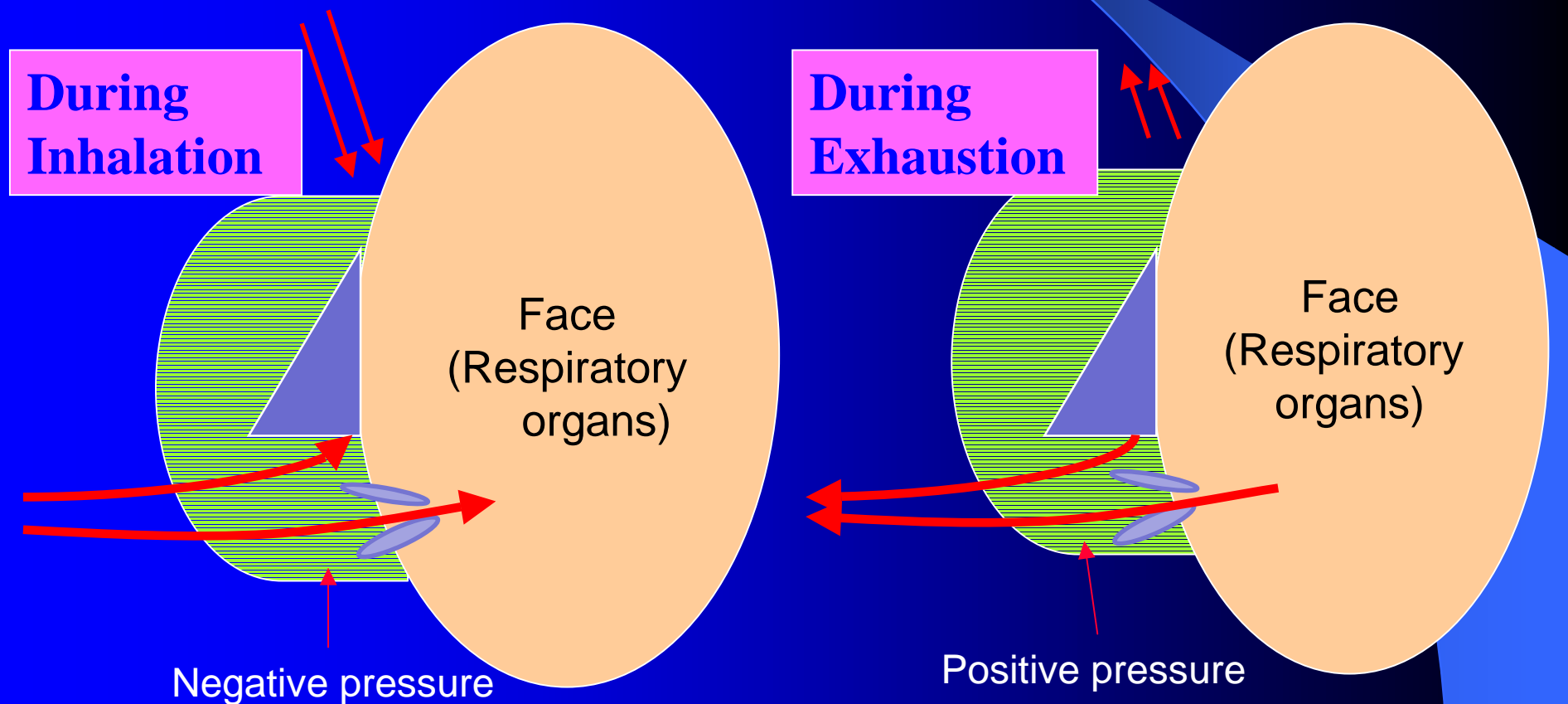
When Selecting a Mask:

- *Dust trapping effectiveness of the mask's filter material with respect to particle size
- *Leakage from the contact surface between the mask and the face



Cautions When Wearing Masks: During inhalation, the inner surface is under negative pressure. As a result, if it is not worn properly, leakage can occur from the contact surface between the mask surface and the face.

Leakage from the contact surface



< Occupational Health >

Ministerial Notifications and
Masks Used in Japan

Ministerial Notification

March 31, 2009

Notification from Labor Standards
Bureau, Japan's Ministry of Health,
Labor and Welfare, No. 0331013

Preventative Measures Against
Exposure to Nano Materials

Safety Education

Education related to respiratory protective gear should involve the appropriate selection of respiratory protective gear, fitting methods, **methods for measuring the leakage from the seal between the mask surface and face**, methods for confirming the seal, and storage and control.

Ministerial Notification

December 22, 2010

Notification from Industrial Safety and Health
Department, Labor Standards Bureau,
Japan's Ministry of Health, Labor and Welfare,
No. 1222-3

Diligence with Respect to Measures to
Prevent Health Problems Due to Work
Dealing with Indium Tin Oxide

3. Working Environmental Management and Work Management

(iv) When dust masks are used, checking the seal between the mask surface and face utilizing a **fit checker** is an effective means of selecting an appropriate mask surface, and performing appropriate checks when the mask is worn.

5. Safety Education

Business operator should implement labor education regarding the following points for relevant laborers based on these technical guidelines and data obtained from MSDS and other sources.

(4) Using Respiratory Protective Gear

Selection of Respiratory Protective Gear for Work Dealing with Indium

It is essential that users wear their respiratory protective gear, and that they check periodically using a mask fitting tester that the leakage rate is under 2 % (protection factor of 50 or more).

Indium (In) ■ ■ ■

Indium phosphide (InP)

Indium arsenide (InAs)

Indium antimonide (InSb)

As it is conductive yet transparent, indium tin oxide (ITO) is used in the electrodes (transparent electric coatings) in LC and plasma flat panel displays. -> LC production

<toxicity>

Interstitial lung disorders -> Cases of death

InP inhalation -> Carcinogenicity

Indium compounds -> Severe lung disorders

Arc Welding . . .

In this welding method, an arc is generated between a metallic material (welding base material) and the welding rod. It is most often used in the welding of iron materials.

A large quantity of smoke (dust) is generated during welding, so workers are exposed to large quantities of high concentration particulates.

Nano Dust Workplaces

Plants where large quantities of fine dust are generated during manufacturing processes

- Ceramics
- Casting industry
- Steel industry
- Nonferrous metal production industries
- Etc.

Industrial (Dust) Masks

Disposable Type



Replaceable (half face coverage)



Industrial (Dust) Masks

Full face dust masks



Half face dust masks

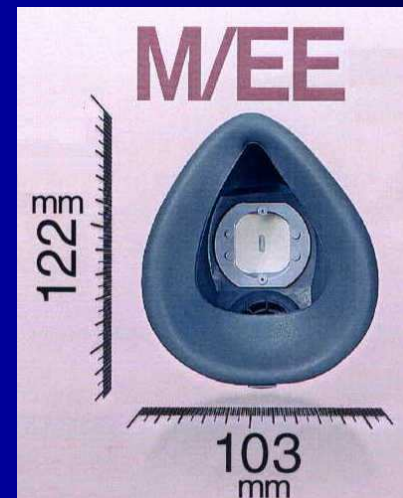
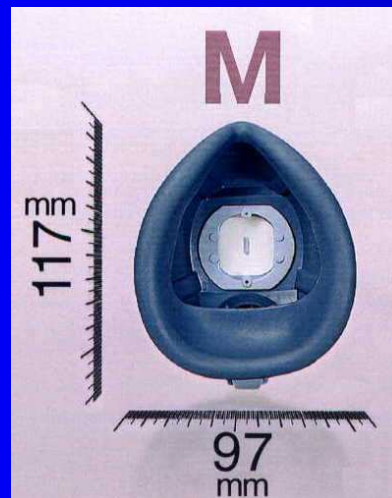
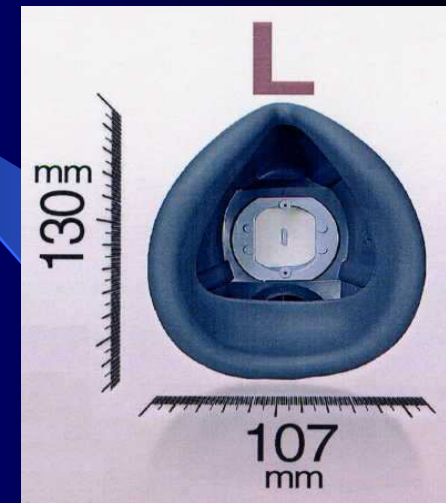
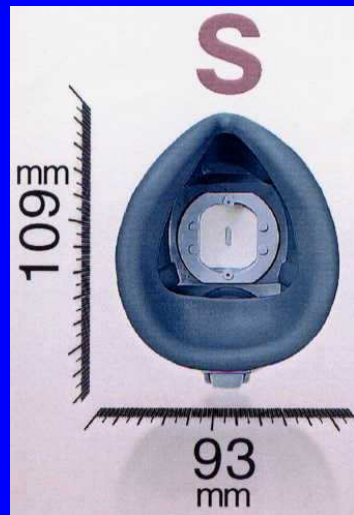


Filters used
(RS3 or RL3)

Japanese National Inspection Standards for Dust Masks

Replaceable Types (R)			Disposable Type (D)		
Solid Particles (S)	Liquid Particle (L)	Trapping Efficiency	Solid Particles (S)	Liquid Particle (L)	Trapping Efficiency
RS1	RL1	80.0%min.	DS1	DL1	80.0%min.
RS2	RL2	95.0%min.	DS2	DL2	95.0%min.
RS3	RL3	99.9%min.	DS3	DL3	99.9%min.

Five types of the same mask are available depending on the facial contact. It is important to select a mask that fits your face.





<Medical Care>

Protecting Medical Personnel from Infections

- Airborne infections
 - > Protection using N95 respirator
- Droplet transmission
 - > Wearing surgical masks
- Contact transmission
 - > Wash hands

Medical Masks (Surgical Masks)

(Performance ?)

Primarily both bacterial filtration efficiency and exhalation resistance are required based on their respective standard grades.

Medical Masks (Surgical Masks)

(Standards ?)

There are no standards in Japan.

As a result, the American ASTM-F2100 standards are primarily applied.

In addition,

Europe: EN14683

Australia: AS4381

Medical Masks (Surgical Masks)

(Bacterial Filtration Efficiency (BFE))?

Staphylococcus (approx. $3\ \mu\text{m}$) is passed through the mask, and a filtration performance of 95 % or more is required.

(Polystyrene Particle Filtration Efficiency (PFE))?

Polystyrene particles ($0.1\ \mu\text{m}$) are passed through the mask, and the higher the value, the better the performance.

Medical Masks

<Top Quality Surgical Masks>

N95 respirator / dust mask DS2

-> When conducting procedures in which an aerosol is generated (respiratory tract inhalation and bronchoscopy), the use of N95 respirators (dust mask DS2 in the Japanese standards) or other protective gear for the respirator organs with comparable or better performance is preferable to surgical masks.

N95 Respirator

N95 is the standard for evaluating respirator filter performance at NIOSH (The National Institute for Occupational Safety and Health) in the United States.

It refers to the trapping of 95 % of sodium chloride particles, which are so small that they are hard to trap with this respirator filter.

Accordingly,
MT-03
Mask Fitting Tester



Mask Fit Test Procedures

<Saccharine Method>

A **qualitative method** in which the sweet odor of saccharine is confirmed, the mask is put on, and the fit is considered good if the odor can no longer be detected.

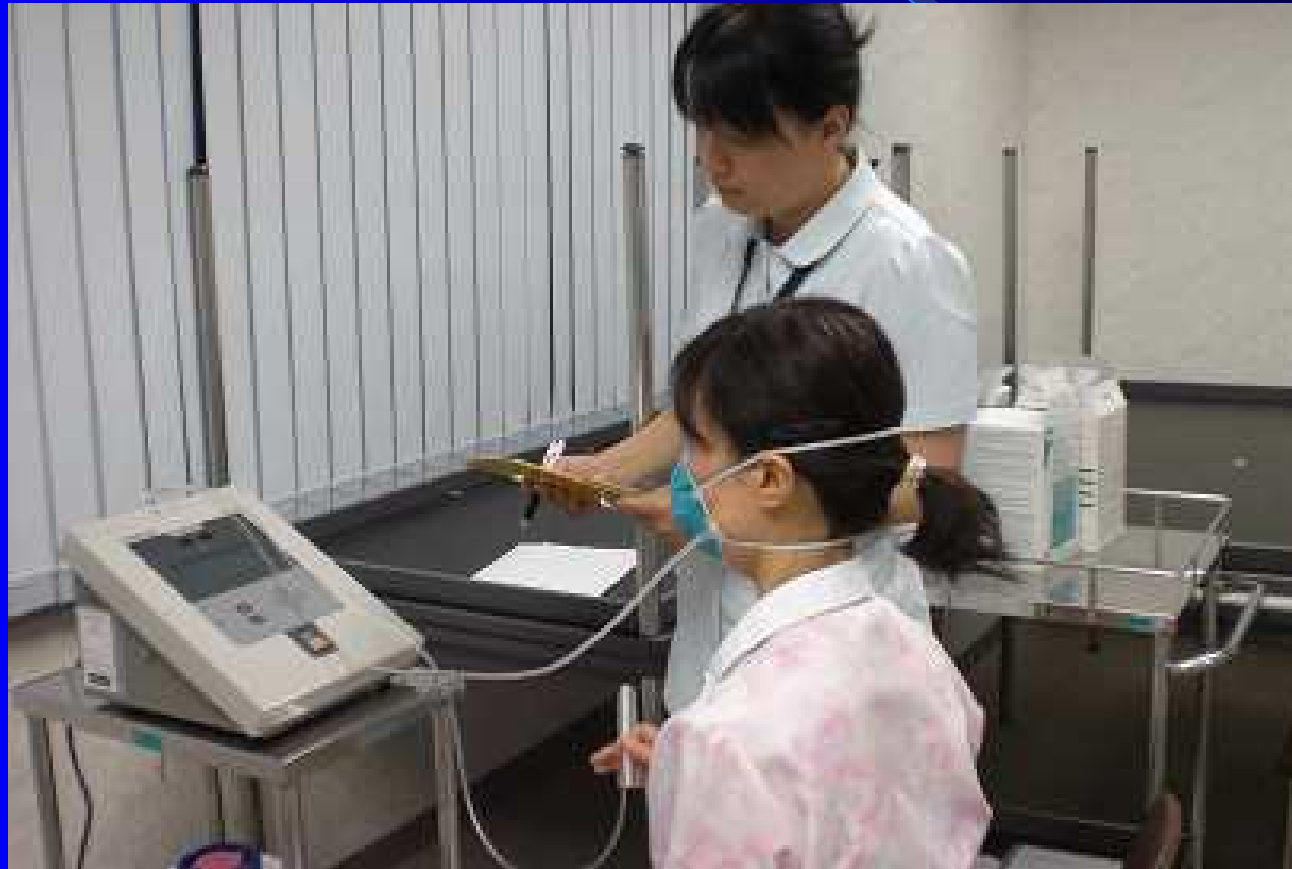
<Mask Fit Tester Method>

A **quantitative method** in which the number of particles inside and outside a mask are measured for a certain interval, and the leakage rate is then displayed numerically.

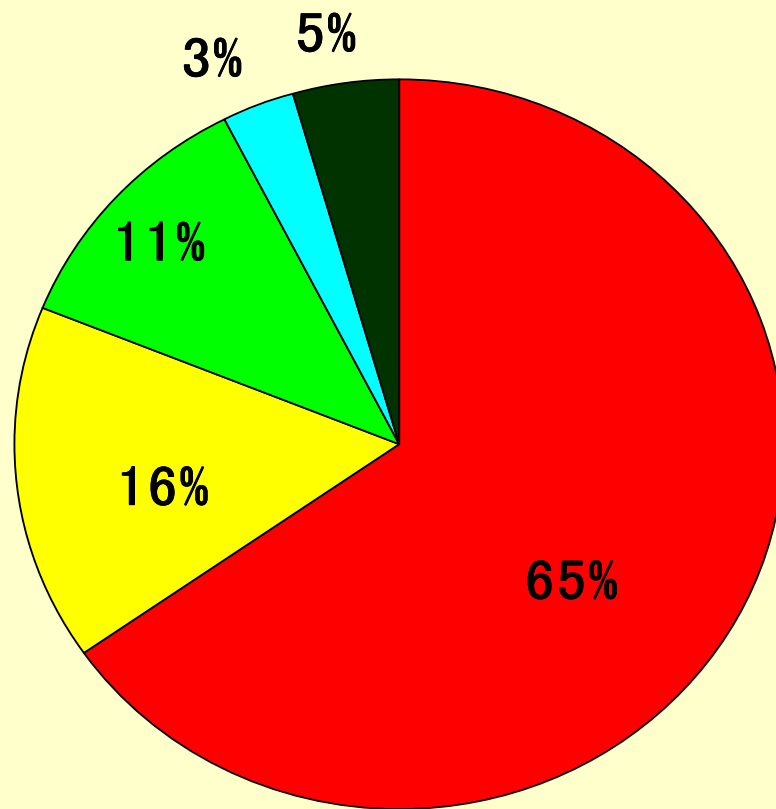
Workplace Mask Seal Tests



Mask Seal Test for Tuberculosis Ward Staff



Fit Test Results, and Progress from Changing Masks and Guidance (N=133)



- 1st time leakage rate under 10% 87 people
- Improvements from guidance on usage 21 people
- Improvements from change of mask 15 people
- Improvements from change of mask
And guidance on usage 4 people
- Unable to reach the criteria despite change of
mask and guidance 6 people

U.S.A. and Singapore

Fit tests for respiratory protective gear have become a legal obligation for all businesses, and this is becoming commonplace worldwide.

Sales Performance (Medical Field)

Okayama Rosai Hospital

National Hospital Organization Tokyo National Hospital

Japan Anti-Tuberculosis Association Fukujuji Hospital

Japan Anti-Tuberculosis Association Shin-yamanote Hospital

Tokyo Metropolitan Kiyose Children's Hospital (currently closed)

Tohoku University

Teikyo University

The Jikei University School of Medicine

Kasai Cardiology Neurosurgery Hospital

Other hospitals in Tokyo

Etc.

Sales Performance (Occupational Health Field)

Exxon Mobil Corporation

Kuraray Co., Ltd.

Sumitomo Chemical Co., Ltd.

Sumitomo Metal Industries, Ltd.

Toyota Motor Corporation

Mitsubishi Heavy Industries, Ltd.

Nippon Steel Corporation Muroran Works

Unicharm Corporation

NGK Insulators, Ltd.

TOTO Ltd.

Etc.

Sales Performance (Other)

National Institute of Industrial Health (currently National Institute of Occupational Safety and Health, Japan)

National Institute of Advanced Industrial Science and Technology (AIST)

Yamanashi, Kagawa, Mie and Kanagawa Occupational Health Promotion Centers

Japan Atomic Energy Agency (JAEA)

Japan Nuclear Fuel Limited.

Research Center for Nuclear Physics, Osaka University

Tohoku Bureau of Economy, Trade and Industry

Mines and energy research center in Indonesia

Korean National Emergency Management Agency

Etc.