



Protective steps against static and dust

TRINC.ORG



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Why does static occur?

1. Friction

As well known, rubbing two different materials causes static electricity.

2. Peeling off

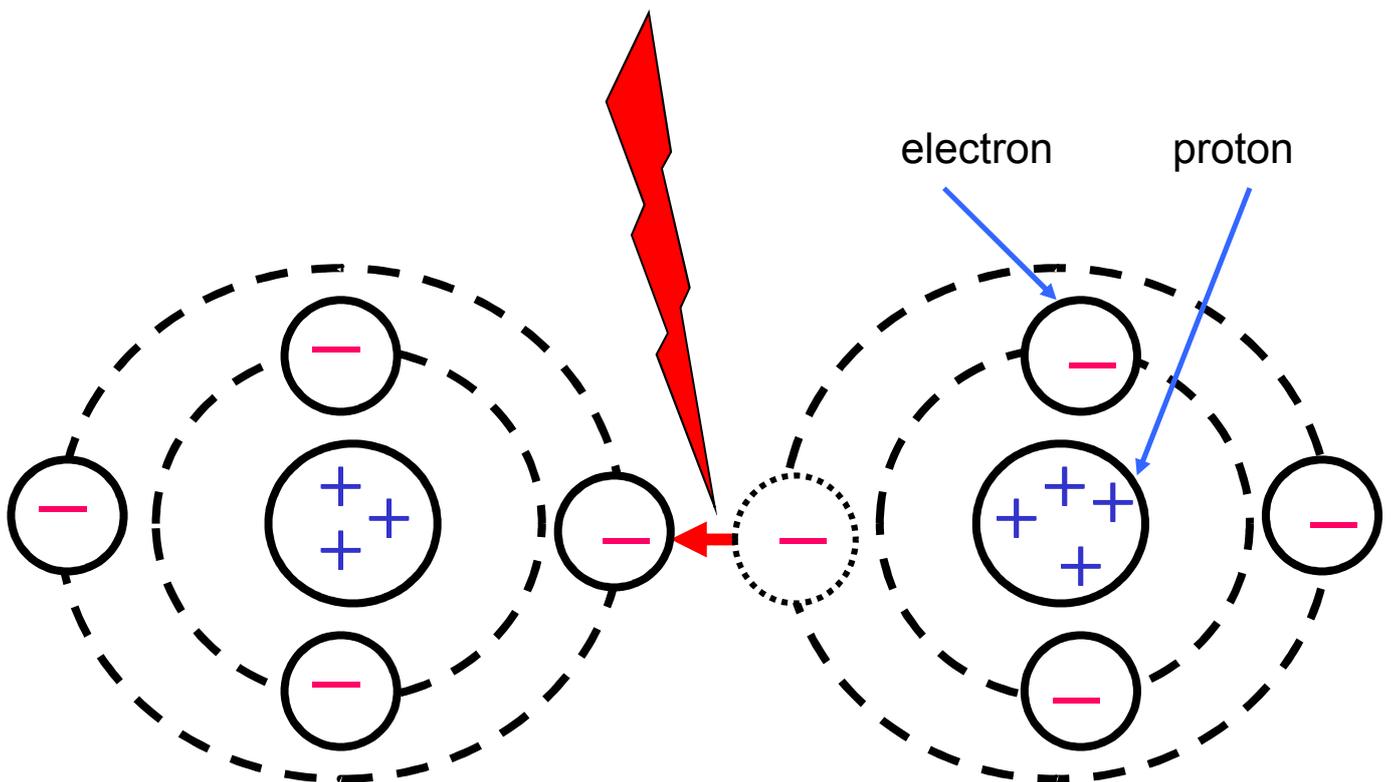
Peeling something from the other causes static electricity. For example, when peeling film and/or removing plastic molding from die, it occurs.

3. Compression, and others

Compression also causes static electricity. Ignitor for cigarette lighter and gas stove is a familiar example.

Why does static occur?

Electrons move from one atom
to another atom by
Friction, Peeling off, Compression, - - -



Charged in minus

Charged in plus

Obstruction caused by static electricity

Variety of obstruction caused by static.

(1) Breakdown of semiconductor

Dielectric breakdown and/or burnout.

(2) Failures due to dust adhesion

Failure on printed circuit board, IC, painting and deposition surfaces.

(3) Operational failure by electronic attraction

Paper and film feed failure of printer or processing machine.

(4) Explosion

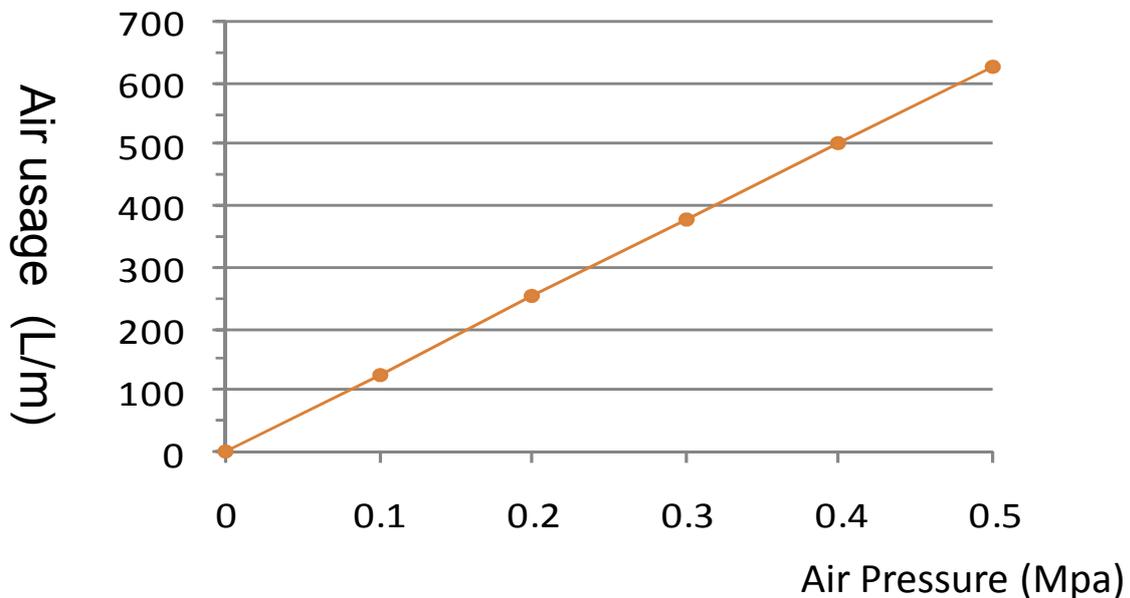
Ignition by static spark at gas-station, oil refinery, oil plant, etc..

At various situations other than above, static causes obstruction.

Save energy / Reduce CO²

1. Low electric consumption
2. No need air
can save air compressor energy
3. No need humidifier by using SFS
4. No need wrist-strip any more by using SFS
5. No need clean room by using SFS
6. No risk of leakage
7. No need care about bothersome maintenance

Air pressure and air usage of K's ionizer (1560mm)



Compressor's electric charge fee using K's ionizer(length 1560mm, electrodes 24pcs)

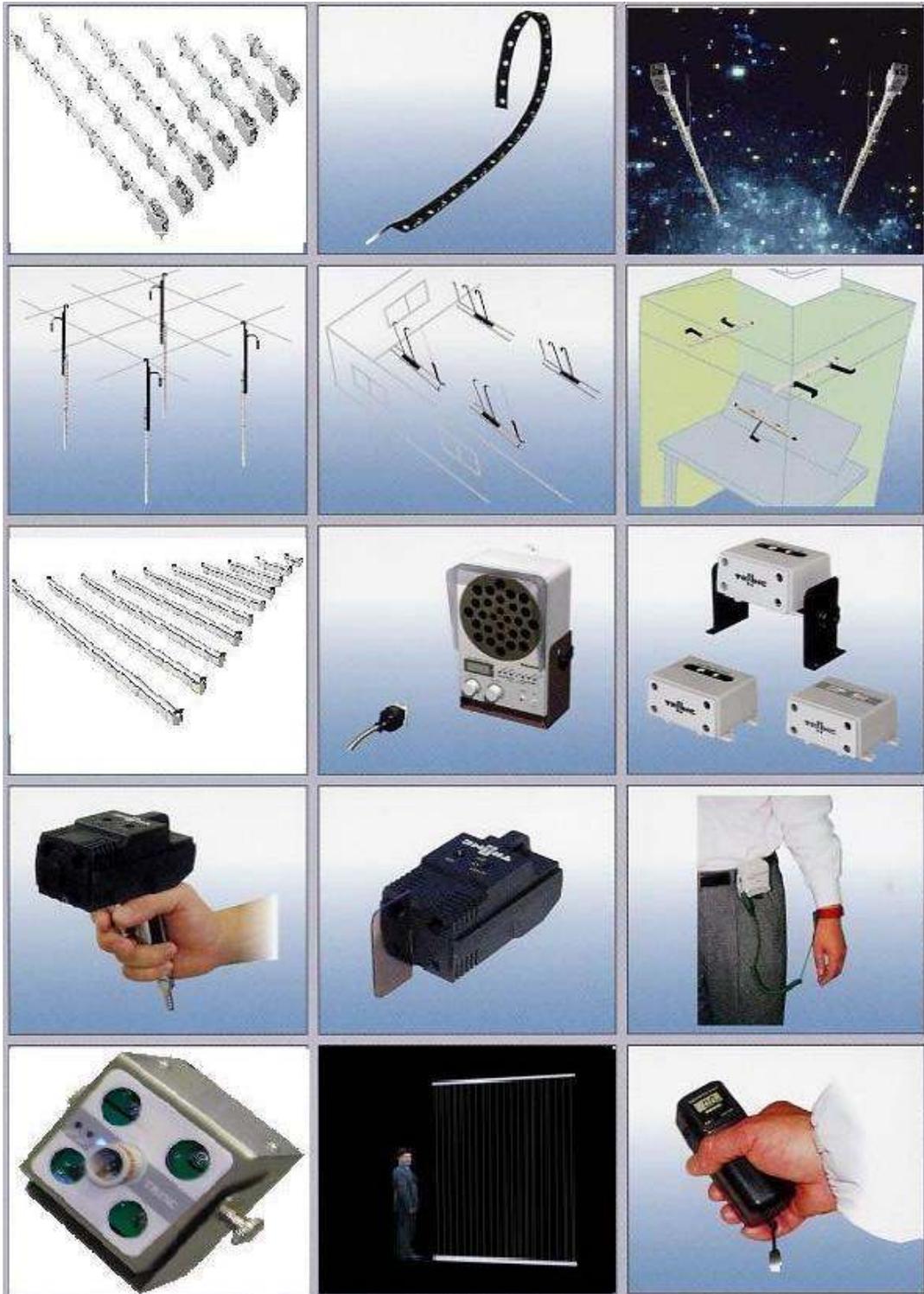
----4316H(16H/dayx276days)----

0.3M.yen=U\$3000 in case of 0.5MPa

0.1M.yen=U\$1200 in case of 0.2MPa

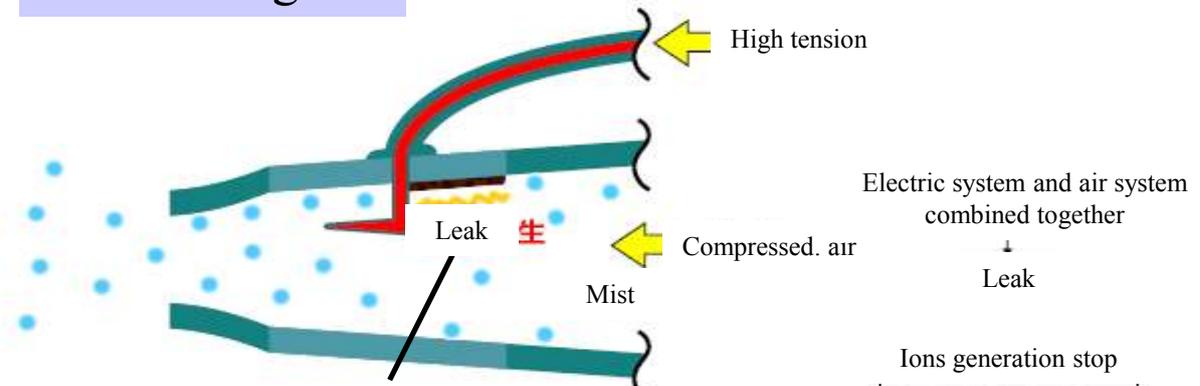
When used in Japan

TRINC Ionizers



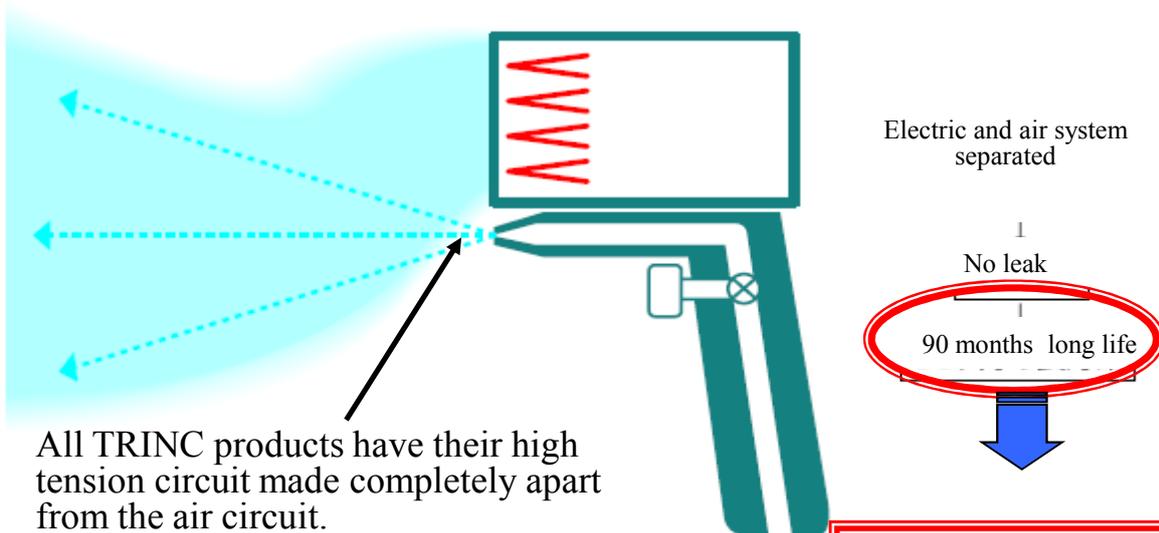
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1. Occurrence of leakage



The contact of the air including mist with the high tension electrode causes a leak. Once the carbon deposits on the body due to the leakage, it continues to occur. And eventually ions generation would stop.

2. Venturi effect



All TRINC products have their high tension circuit made completely apart from the air circuit.

Therefore, there is no risk of dangerous leak caused by the compressed air, and it has a long life with no troubles.

In some cases customer does not even notify the defect.

Longer life with 30 times conventional ionizer.

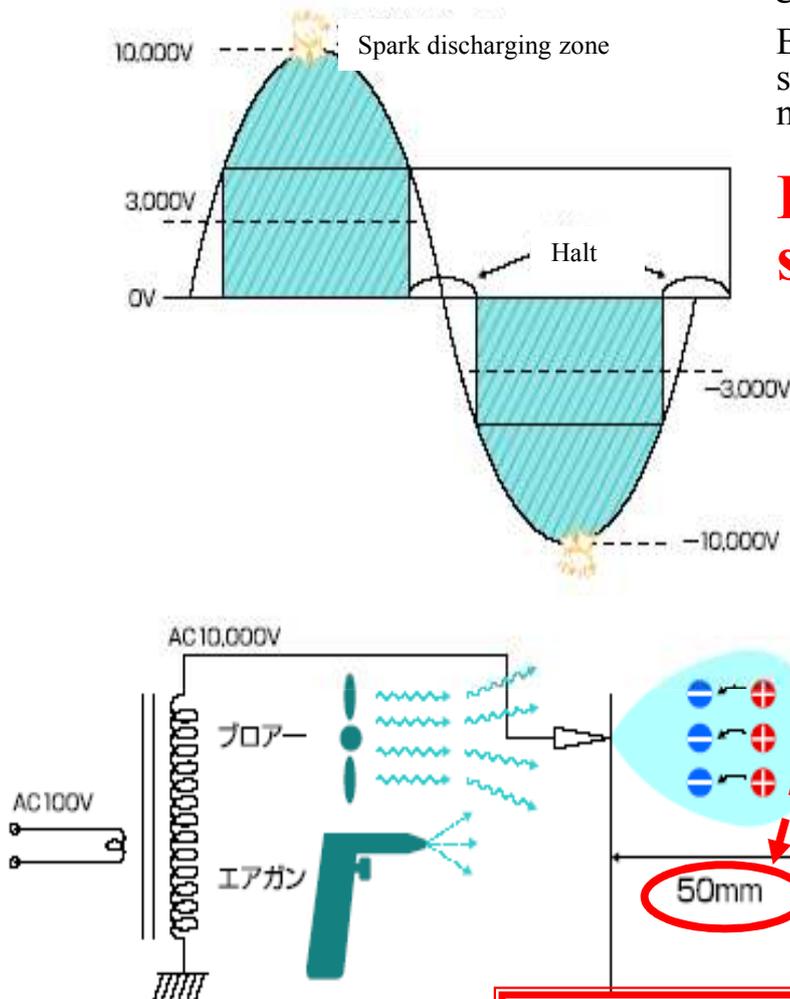
AC type (Competitor's product)

■AC型

Plus and minus ions are alternatively generated.

Because alternatively generated in a short time, they are combined to be neutralized and disappear. Therefore,

Ions leap and reach so short distance.



Desperately in need of external force

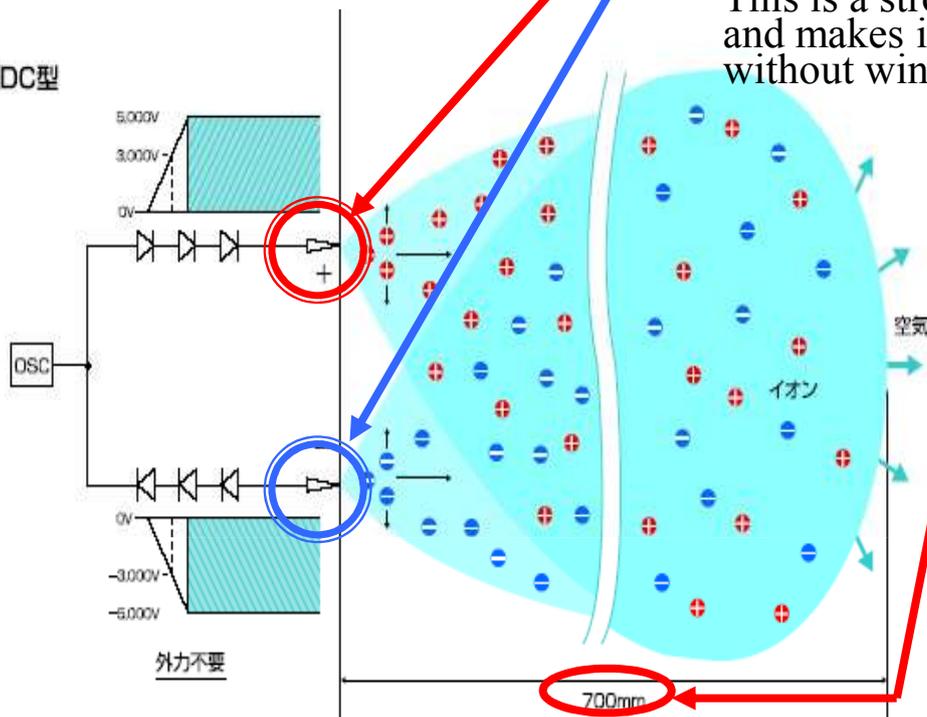
- It cannot do without external force.
- The air from FAN raises dust.
- The trouble caused by leakage causes a vicious circle.

TRINC Special Features (DC type)

- +/− ion is fixed on its dedicated needle.

- Greater ion generation due to less self-dissipation in their bonding. This is a strong feature of DC type and makes it possible to ionize as far as 700mm.

■ DC型



On the DC type, the plus electrode (needle) keeps generating the plus ion, and same is true for minus side. So **the total amount of ions generated is greater** and leaps out far into air with the help of the repulsion (reaching as far as 700mm without wind).

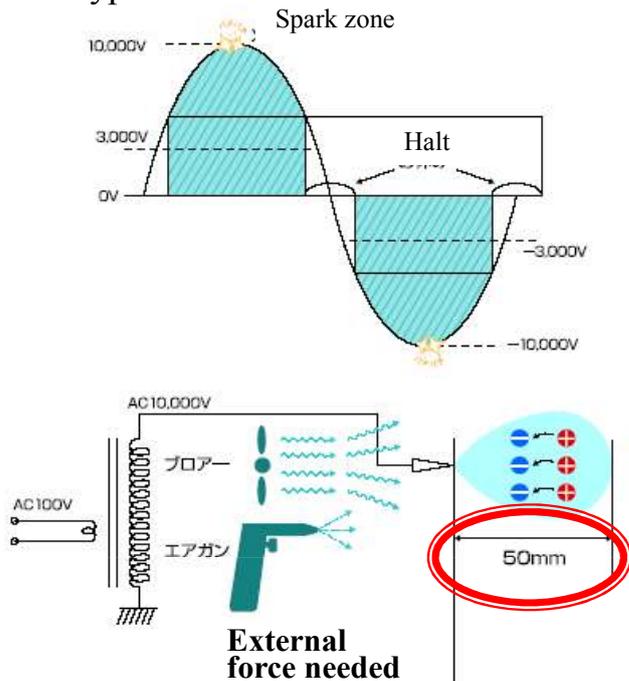
Therefore, **no external force is required** (No-wind Ionizing). The **risk of electric leak is none**. And even the air-blow is used, the air is collaterally supplied from the separated channel.

The large ion cloud is produced in front of the ionizer, discharging the work in a short time and effectively.

Ionizer, AC and DC types

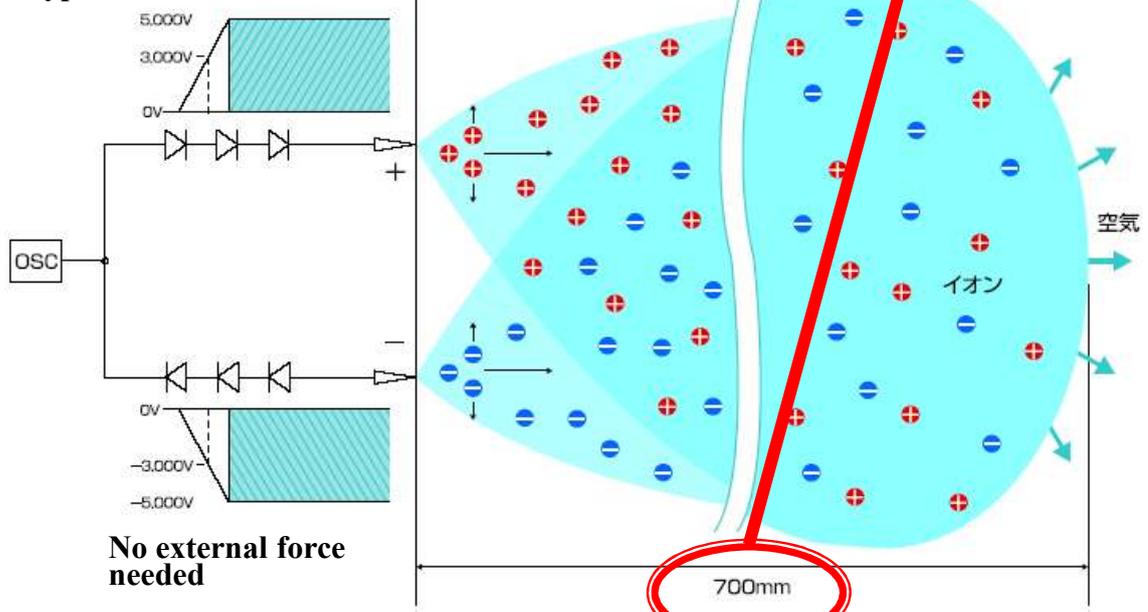
A ionizer is available in AC and DC types

AC type



Ions leap out far in the air 10 times competitor's (AC type) ionizer.

DC type



TRINC Static-free Space Ionizer

株式会社 TRINC

TRINC

Static-free Space Ionizer

This is the appliance to dissipate static in the space by radiating ions into it.

Function

1. To dissipate static charged on dust afloat in the wide space
2. To dissipate static in the wide space

As a result

1. Drastical reduction of dust related defect
2. Holding-down static-related problem

An innovative tool with new principle is born.

Dissipating the static charged on dust before the dust adheres to work. This is the Static-free Space Ionizer TRINC has developed.

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Behaviour of Dust

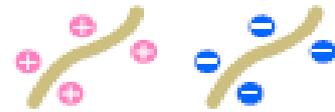
Behaviour of dust

Dust is classified into 1. **Activated dust**, and 2. **Inactivated dust**.

1. Dust classification

Activated dust

The active dust charged with static and having adhesive force.



Inactivated dust

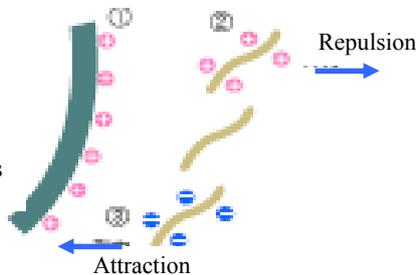
The inactive dust neither charged with static nor having adhesive force.



2. Dust adhesion mechanism

(1) Insulating materials (Plastic, etc.)

- 1 Work piece charged with positive static.
- B. Dust charged with static
- C. Work piece attracts opposite polarity.

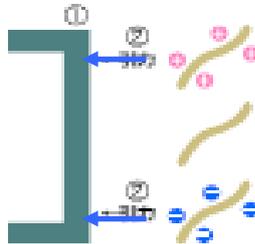


D. Adsorption of dust

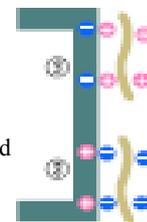


(2) Conductive materials (Ion panel, etc.)

- A. Work not charged
- B. Work attracts either plus and minus charged dust.



D. As work is conductor, the reverse polarity electron gather behind the dust and attract it.

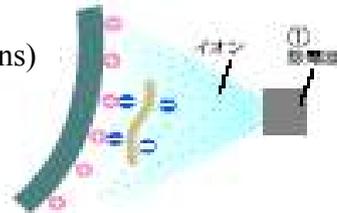


Dust adhesive mechanism varies between the isolated materials (like plastic) and the conductive materials (like ion panel).

Mechanism of dust removal

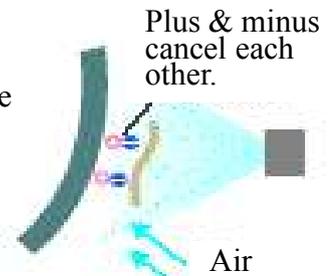
(1) Insulating material (plastic, etc.)

A. Ionizing (pouring ions)

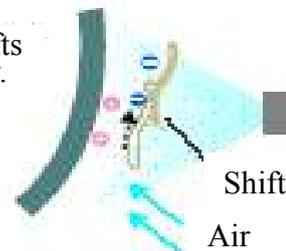


B. The static stays on surface dissipate.

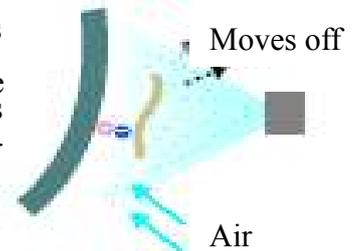
C. Air blown.



D. Dust shifts by air-blow.



E. Plus & minus are loosely combined at one point and dust is blown off by air.

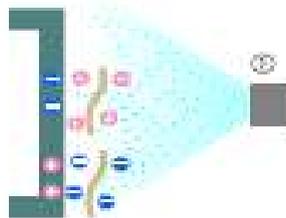


Static can be removed completely in case of insulating material. Thereby dust can be taken off.

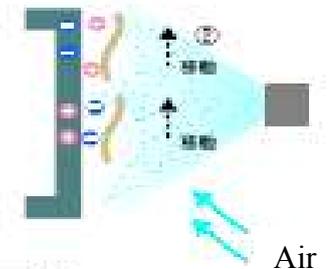


(2) Conductive material (iron plate, etc.)

A. The static on the outer surface of dust alone is taken off by pouring ions.



B. Dust just shifts with air-blow.



C. Dust just shifts, does not scatter.



As the dust charged with static has once stuck to conductive material gets hard to be remove, dissipating static from dust before it sticks is very important point.

Dust protection measures

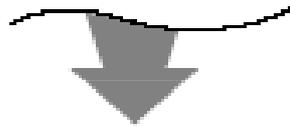


Dust protection steps

The dust that has once stuck is really hard to remove. Therefore, the point is that the static should be removed from dust while it is floating in the air.



Filling up the space enclosed with ion barrier with ions.



The only tool to do with this is
TRINC's Static-free Space Ionizer
(SFS Ionizer)

To dissipate beforehand the static charged to the dust floating in the space so that it would not stick to the work, it is necessary to fill up the wide space with ions. And the Static-free Space Ionizer (Wide Space No-wind Ionizing appliance) is the tool for that purpose.

Effectiveness of SFS Ionizer



The SFS Ionizer only from TRINC dissipates the static charged to dust in the air to dampen its adsorption.

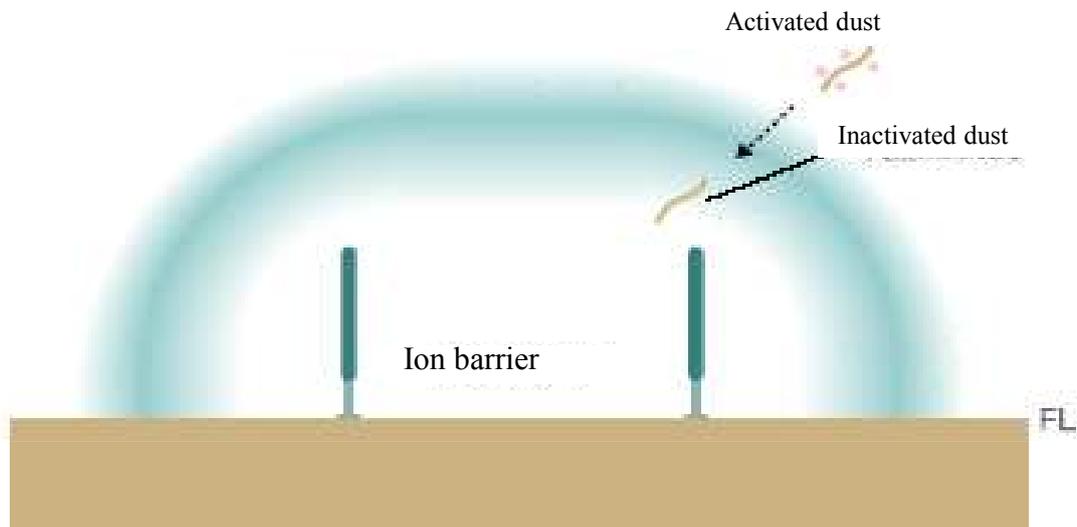
Effectiveness 1.



1. As a result, the wall-less clean room is embodied.
2. Thereby dust would not stick to work and fall down quietly.

Dust is classified into two groups;

- (1) Activated dust (charged with static and has adsorption force.)
- (2) Inactivated dust (not charged with static and has no adsorption force)



Because the SFS Ionizer creates ion-barrier, the dust coming inside it is dissipated to be **Inactivated dust**, and resultantly

The dust loses adsorbility to the ion plate.

On the other hand, as the ion plate has not been charged with static,

+ - The ion plate has no adsorption force.

The dust would not adhere to the plate.

The wall-less clean room is embodied.

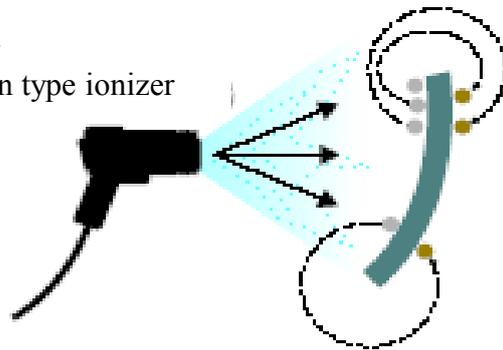
Room-less clean room

Effectiveness 2.

The dust wrapping around which has been considered so far impossible to get rid of can be protected.

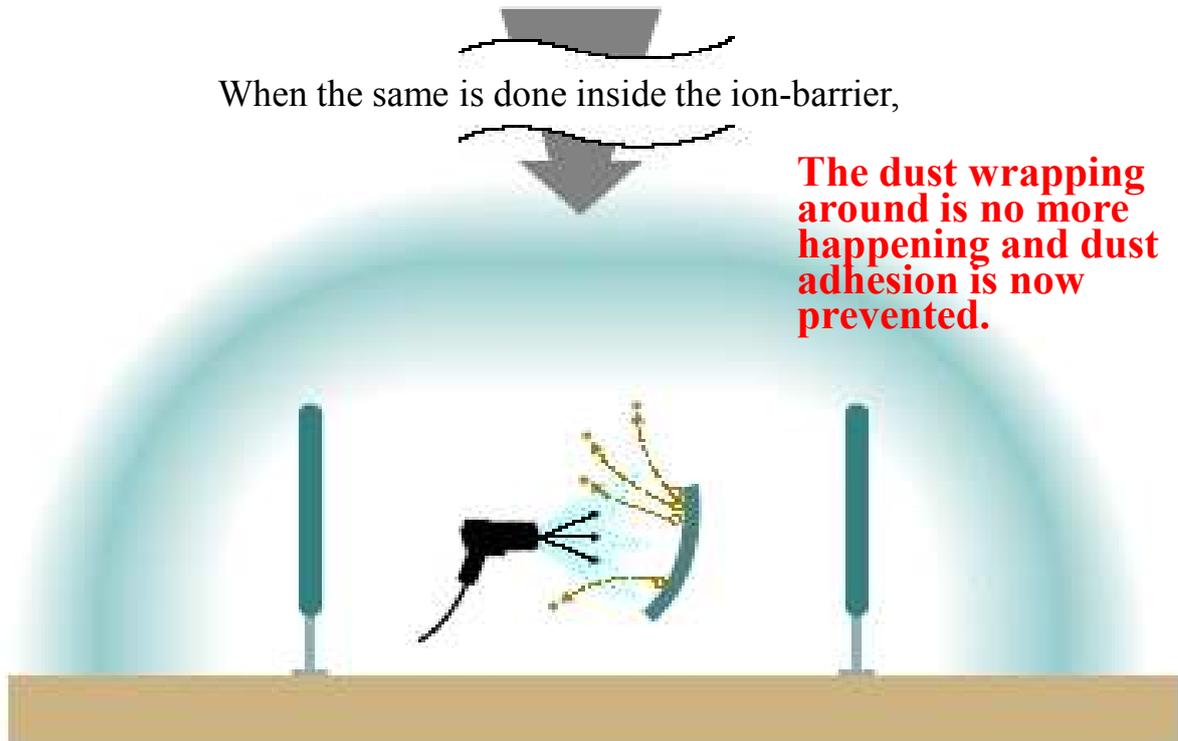
Example 1.

Air-gun type ionizer



The dust just wrap around from the back to the front side of dust and wouldn't scatter.

When the same is done inside the ion-barrier,



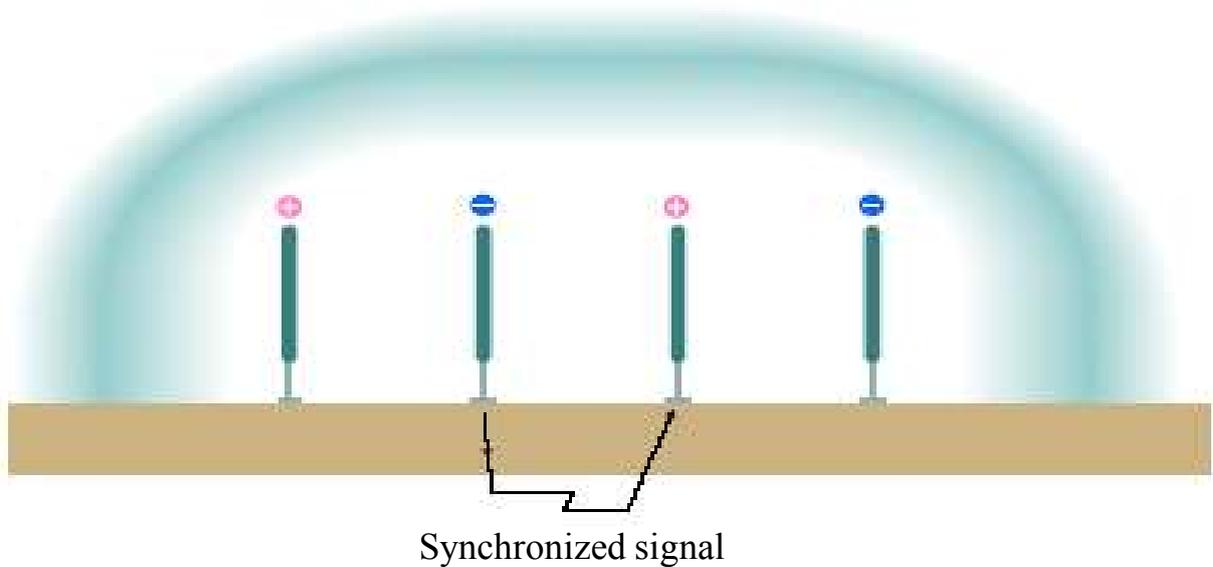
The dust wrapping around is no more happening and dust adhesion is now prevented.

The scattered dust which the static has been dissipated inside the ion-barrier becomes inactivated dust and would not wrap around.

Ionizing in vast space 2



(3) In order to eliminate the ion-deficient zoon,



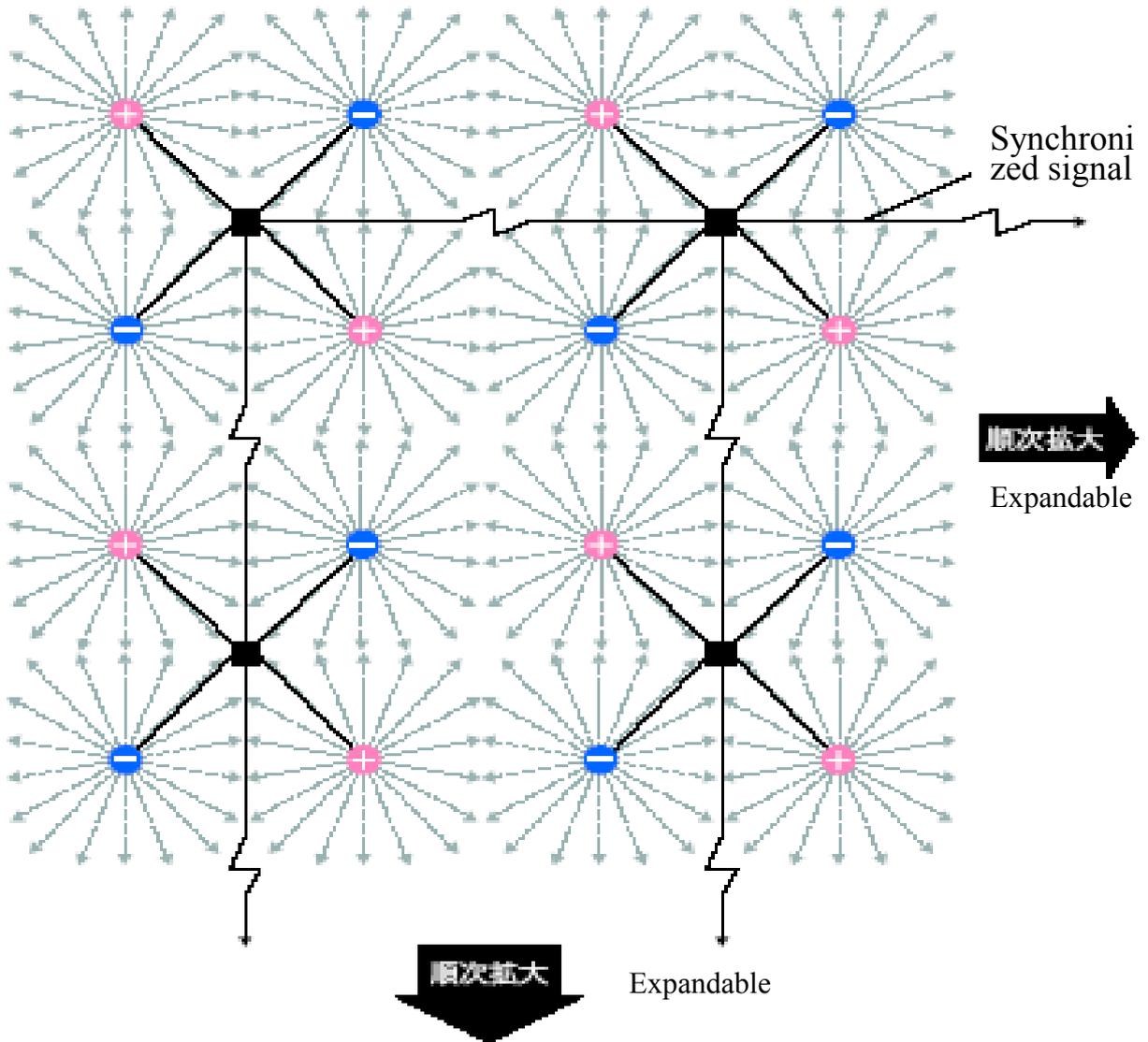
Synchronising control is required so that the two neighboring ion-bars get to have a reverse polarity each other. Thus the every ion generated is attracting each other and they are spread wide to cover whole space evenly.



Vast Space Ionizing

Layout

Layout for the vast space ionizing (Enlargement method of no-static space)

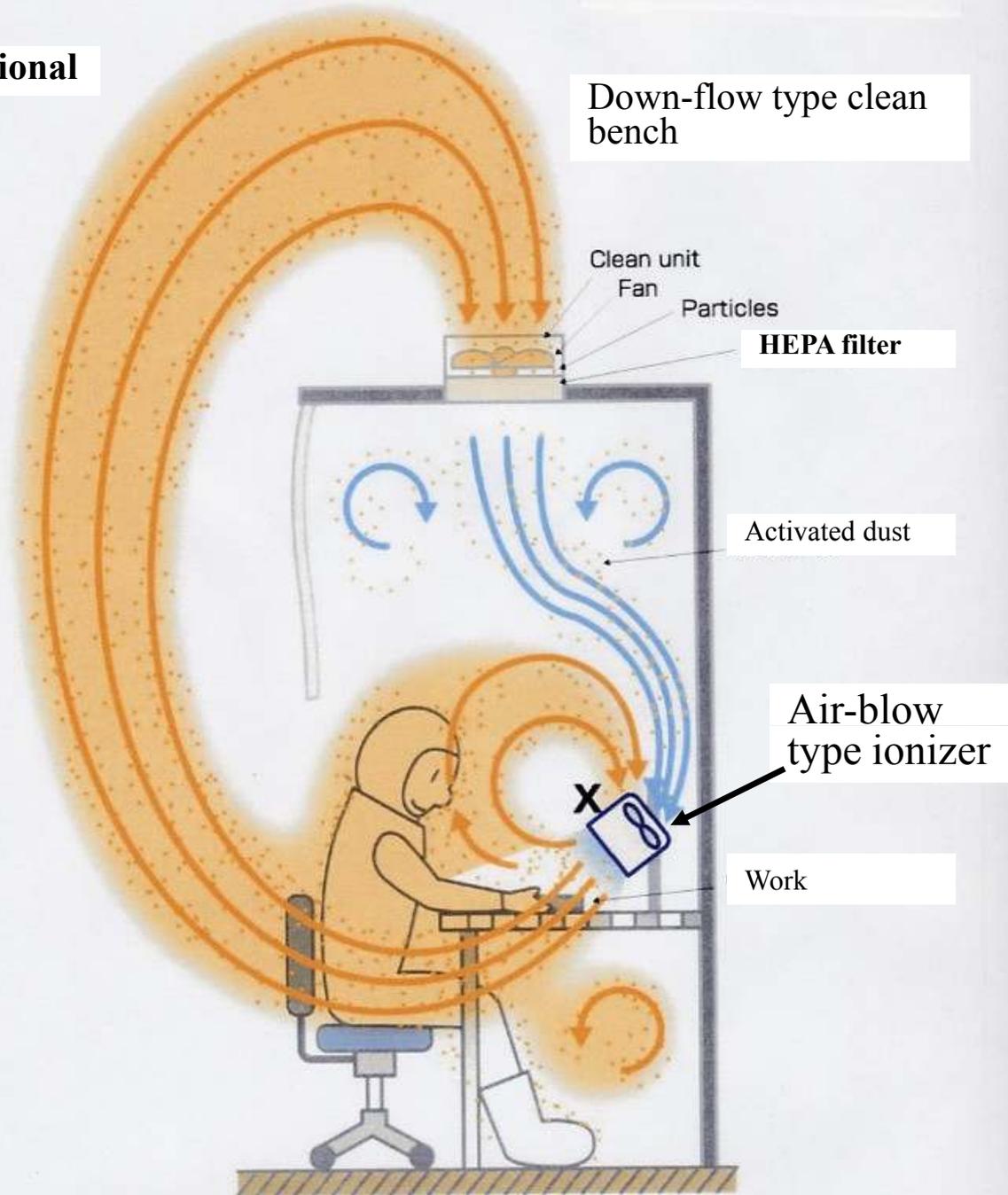


Embodiment of vast clean room

Actual condition of clean bench

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Conventional



<Conventional>

1. As the air-blow type ionizer (X) is used, the dust produced from operator is circulated into the clean bench.
2. The dust expelled from the air-blow fan is directly poured to the work.
3. The work is placed on the desk, which imply that ionizing is not carried out.
4. As dust afloat inside the clean bench is not ionized, so it is activated dust and sticks to work.

Therefore, the dust from the operator and the dust from the work is not ionized and sticks to the work.

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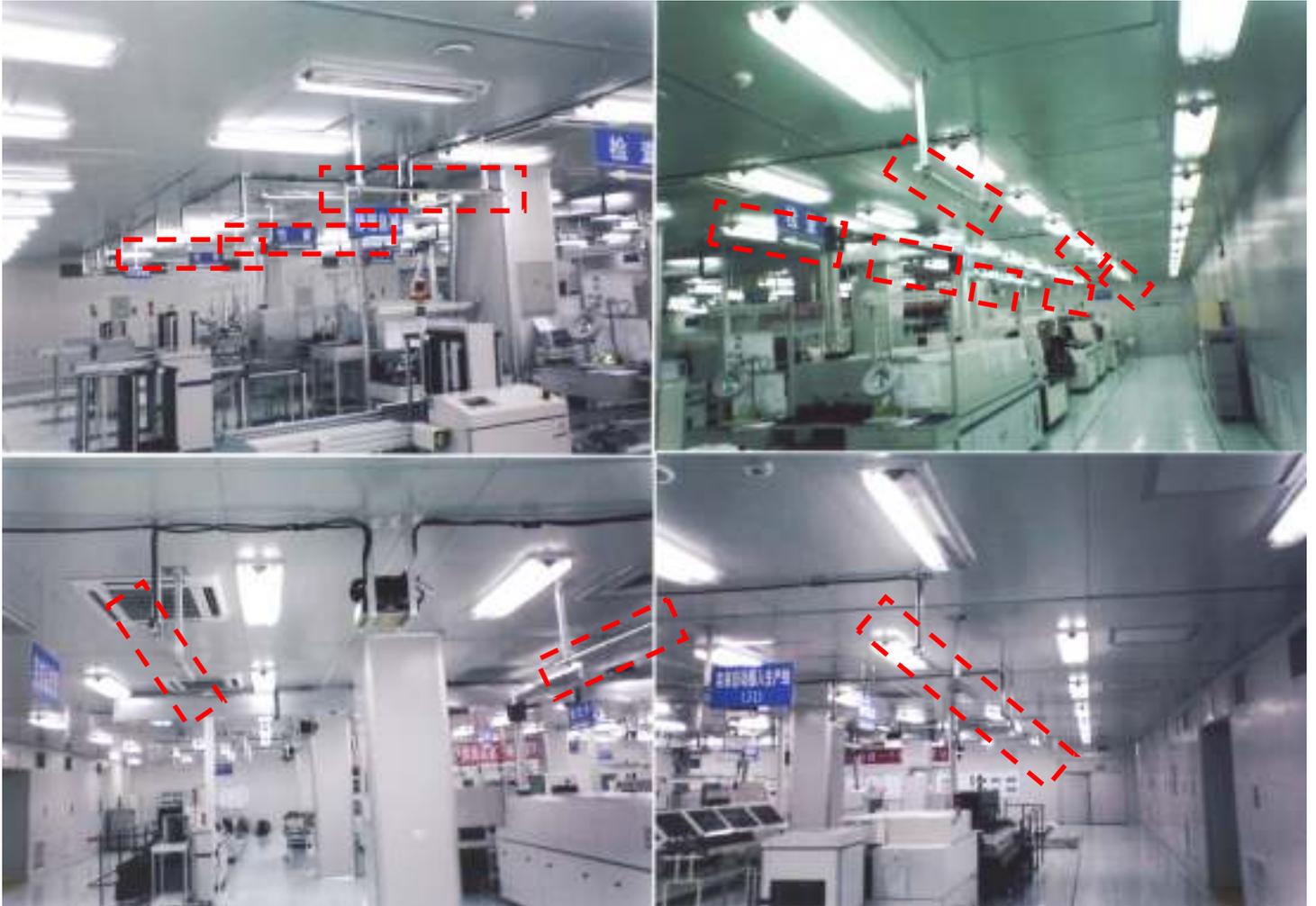
Therefore, the dust from the operator and the dust from the work is not ionized and sticks to the work.

SFS Ionizer Installation in working apparel room before clean room



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SFS Ionizers installation at chip-mounting process (inside clean room)



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One touch cleaner can clean all electrodes by one touch

