

Use of local ventilation devices is required in the maintenance of components at nuclear facilities in order to prevent workers' internal exposure resulting from radioactive dust and gases generated during the work and to prevent contamination dispersion in the surroundings. The following points must be considered in selecting an appropriate local ventilation device:

- (1) capability to maintain an appropriate capture velocity,
- (2) capability to collect and adsorb generated dust and gases effectively, and
- (3) capability to move the device easily to a workplace for use.

Local ventilation devices of JER
Japan Environment Research Co., Ltd. (JER) develops and sells various types of local ventilation devices as a measure against air contamination caused by various operations performed in nuclear facilities from a professional viewpoint of radioactive contamination management. Special consideration is given to the secure collection of radioactive material, reduction in weight and size of devices, countermeasures against contamination of devices, stable performance and usability in consideration of special circumstances of nuclear facilities.

General-purpose local ventilation device, Alara Venti Series

Alara Venti Series is a local ventilation device that has been most widely used in nuclear facilities, and the total number of sales has exceeded 3,000 units.

The foremost feature of Alara Venti Series is that it allows easy transfer to a workplace and placement in a narrow space. In the case of the UM100 model, a worker can hold and carry it in narrow spaces within a containment vessel. The installation area is only 38x35 cm for model 1S and 71 x 67 cm for model 2C.

The second feature is the reliable dust collection mechanism. The structure does not allow contaminated air to be exhausted unless it goes through the HEPA filter (collection efficiency: 99.97% or greater) by firmly holding both ends of the filter and not using a cover around the filter. Should the device be operated without setting a filter, contaminated air would not be sucked from the intake port

The third feature is the structure that is unlikely to be contaminated and is easily decontaminated so that the location to store the device is not limited

ALARA Venti Series, the most widely used local ventilation device in Japan



to radiation controlled areas. Other considerations, such as a dual partitioning feature that allows easy transportation, are given based on our wide experience in field work.

Fume collector

Cutting and welding of metallic materials will generate metallic fumes as very fine particles. Direct collection of such fumes would cause clogging in a short time, leading to a huge replacement cost.

Through a joint research with Chubu Electric Power Co., Inc., JER developed a fume collector that can efficiently collect radioactive fumes and does not need to exchange filters for a long time. The initial exhaust flow is large, 40 m³/min. Fumes alone are captured and recovered by a special filter, and then cleaned air is exhausted through a HEPA filter in the final stage. In addition, safety measures are taken, such as various types of fire protection functions and the automatic shutdown mechanism for abnormal conditions using a temperature sensor in the dust chamber. The fume collector has been applied to plasma cutting of metallic waste, etc. at numerous nuclear power plants, and has gotten high marks for performance.



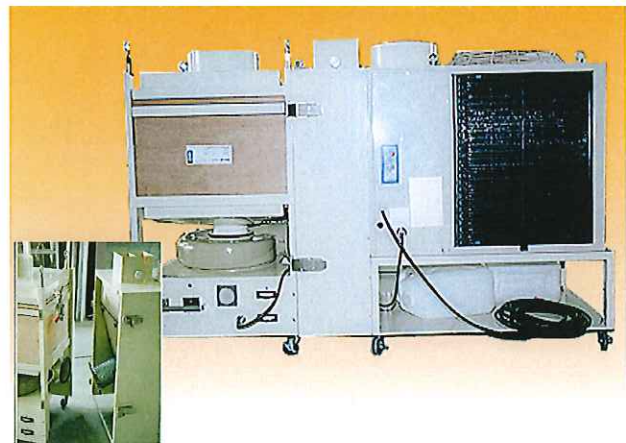
JER-FC, Fume collector equipped with automatic brush-off mechanism

Local ventilation device with air conditioner

Handling highly-contaminated components requires workers to wear heavy equipment to

prevent body contamination. The U.S. standards for work in warmer environments specify that wearing impermeable work clothing, such as anorak, is equivalent to wearing cotton work clothing in an environment at a 6 deg C (WBGT) higher temperature. Particularly, work in summer gives considerable burden on workers, causing a reduction in work efficiency.

Possible measures include a reduction in the amount of equipment and a decrease in ambient temperature. Among those measures, it is reasonable to reduce ambient temperature in air contaminated areas by collecting radioactive dust and circulating part of the cleaned air after cooling. JER has developed a partial circulation-type local ventilation device with air conditioner as a countermeasure for high temperature. This device is effective for ventilation and cooling of a green house. It is possible to separate this device into a dust collector and a spot cooler, each of which can be used as a single device. We recommend you this device as a measure to improve your work environment in summer.



Local ventilation device with air conditioner (connection type) as a countermeasure against heat

Ventilation device for blasting

Blasting generates a great amount of dust including blast material. Such dust is collected by a bag filter with a brush-off mechanism and cleaned air is exhausted through a HEPA filter. Since our system incorporates a bag filter system at the stage prior to Alara Venti, it is possible to use each device separately depending on the

purpose. In our experience, there was no need for filter exchange during work.



Ventilation device for blast working (It collects blast dust effectively.)

Local ventilation and collection device for radioactive iodine

Previously, it was common to use special-purpose granular activated carbon to adsorb radioactive iodine gas. JER has developed a lightweight, high airflow-type radioactive iodine filter with high collection efficiency. The filter uses a new material, activated carbon fiber, instead of granular activated carbon. The use of this new filter has allowed us to produce a local ventilation and collection device for radioactive iodine gas that is significantly more compact than previous models. The turbine component ventilation device that was delivered to a BWR-type nuclear power plant is a device with a high adsorption performance, consisting of a mist separation filter, heater, dust filter and activated carbon fiber filter.



Radioactive iodine local ventilation device (equipped with a recently-developed activated carbon fiber filter)

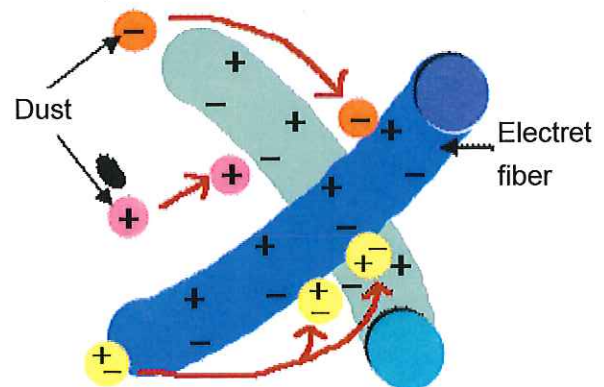
This newly-developed radioactive iodine filter can be applied to a PWR-type nuclear power plant, as a filter for the containment vessel circulation system. Because spent filters can be disposed of by incineration, it is possible to reduce the amount of waste significantly.

Simplified dust removal filter

Have you ever wanted to collect nonradioactive smoke and dust in a simple way at nuclear facilities? The simplified dust removal filter developed by JER can present you a reasonable dust collection solution that has a dust collection efficiency of 98% or more by just attaching a bag-shaped filter to your exhaust fan. An electret filter material having a high collection efficiency by means of electrostatic force and has a lower pressure loss is used for the main filter. You can use this device for temporary operations, such as concrete chipping and collection of weld fumes.



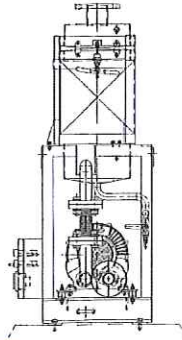
Simplified dust removal filter, which can be used by simply attaching it to a fan



An electret filter is adopted to collect dust by means of electrostatic force.

Negative pressure holding device for system chemical decontamination

During system chemical decontamination, it is necessary to maintain the system at a negative pressure to prevent dispersion of contamination. This device uses a gust blower and is capable of maintaining a relatively high negative pressure condition.

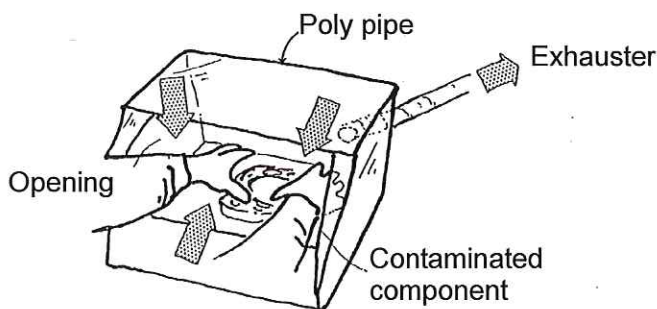


System negative pressure holding device

In addition to the devices introduced above, systems that can cope with various kinds of air contamination in nuclear facilities have been developed and applied. Such systems include a temporary ventilation device for the whole building, dehumidification and ventilation device, and adsorption device to remove smell or toxic gas. When you have any trouble or needs to control air contamination in work planning, please contact JER, an "ALARA" brand company familiar with radiation control.

Dust control (simple hood box)

This is a simple hood box developed to locally contain contamination by wisely using a local ventilation device. The hood box is attached to a component subjected to inspection or maintenance, and work is carried out by inserting one's hands in the box. The framework, made of polyethylene, can deform flexibly. Contaminated dust is not exhausted from the opening because a sufficient amount of air is suctioned. The worker can handle highly contaminated components without wearing a mask.



Simple hood box (The worker can handle highly contaminated components without wearing a mask.)