

## POJ008: General platform presentation

### On factors of discomfort when wearing respirators with loading of ergometer exercise

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#### Abstract:

Respirator wearers sometimes feel discomfort, for example hot, not easily breathing, and so on. However, we could hardly find the reports that deal the relation between the discomfort and physiological items. We studied which physiological items are related to the discomfort when wearing respirators, and also how the wearers feel discomfort among the types of respirators.

Twelve subjects who wore respirators were loaded with ergometer exercise. We used replaceable dust respirators, tight-fitting type PAPR (full facepiece; breath response type) and loose-fitting type PAPR (hood; **continuous** flow type).

The examined items are as follows;

- a) Declaration of subjects: Rating of Perceived Exertion (RPE) and Subjective judgment by Visual Analog Scale (VAS)
- b) Physiological items: Arterial blood oxygen saturation (SpO<sub>2</sub>), Heart rate and Rectal temperature
- c) Items concerning respiratory inlet coverings: Oxygen and Carbon dioxide concentrations, Temperature, Humidity and Pressure in respiratory inlet covering
- d) Performance of respirators: Inward leakage

We obtained that the measured values of physiological items correspond to the level of declaration of subjects. It was not always clear whether the items concerning respiratory inlet coverings are related to the level of subject discomfort.

When using loose-fitting type PAPR, particularly, we observed that all subjects declared the hot and humid condition during exercise regardless of keeping relatively low temperature and humidity in the breathing area.

This declaration of the hot and humid condition might be originated from the body temperature rise and the increase of sweating by exercise.

Any contents of O<sub>2</sub> and CO<sub>2</sub> in the respiratory inlet coverings were within the physiological safety levels when adopted the data which were estimated inhalation period.

We need further study because the test with declaration of subjects may have an uncertainty.